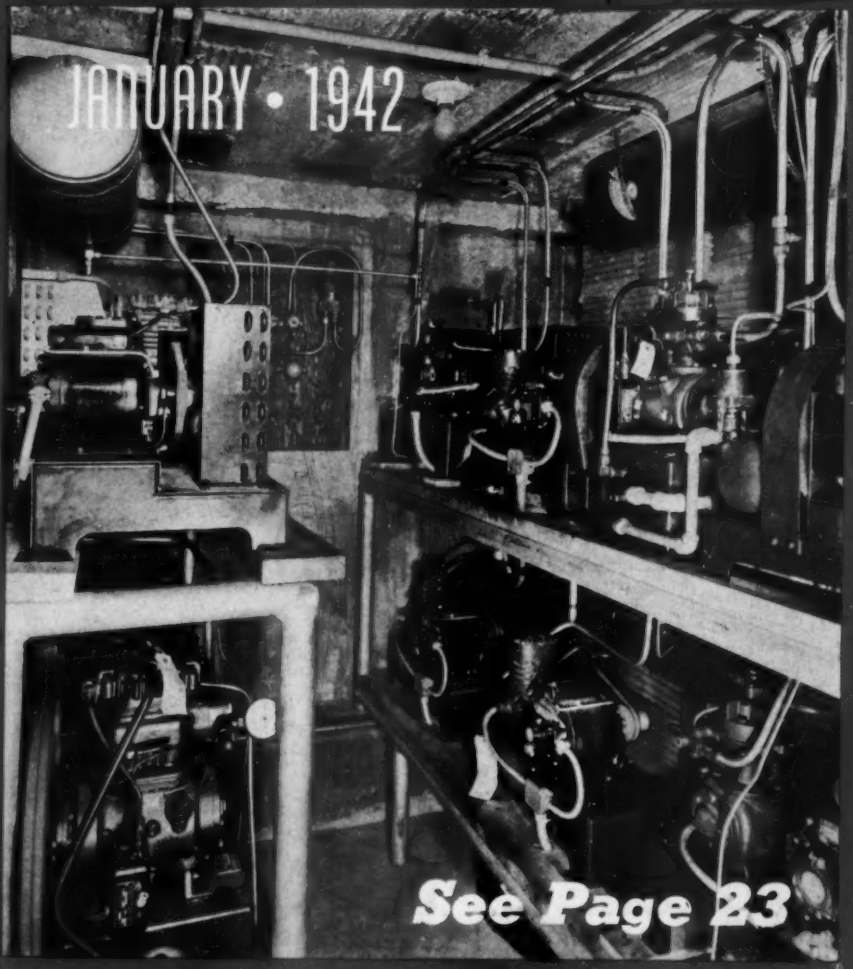
The Refrigeration Service Engineer



See Page 23

Keep 'em Going!

Serve by maintaining

TRADE MARK

Rotary Seal has pioneered in the manufacture of mechanical shaft seals. Because of this specialization, it offers the best in shaft sealing.

SEE YOUR JOBBER

ROTARY SEAL COMPANY

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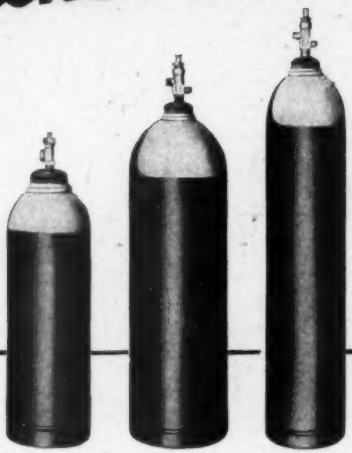
THE REFRIGERATION SERVICE ENGINEER, Nickerson & Collins Co., Publishers, 435 N. Waller Ave., Chicago, Ill. Published monthly. Vol. 10, No. 1, January, 1942. Entered as second class matter March 4, 1938, Chicago, Ill., under the Act of March 3, 1879. Subscription in United States, $2.00 per year; all other countries, $3.00 per year.

Sized for service men's convenience



Ansul cylinders of Sulphur Dioxide and Methyl Chloride come in several sizes, but there are three that are especially useful to the service man. These are big enough to contain sufficient quantities of gas, yet small enough to be carried easily in a service truck.

THE ANSUL JOBBER NEAR YOU CAN SUPPLY THESE HANDY-SIZED CYLINDERS AT YOUR CONVENIENCE

SO_2	25 lbs.	70 lbs.	100 lbs.
CH_3Cl	15 lbs.	40 lbs.	60 lbs.

ANSUL

SULPHUR DIOXIDE
METHYL CHLORIDE

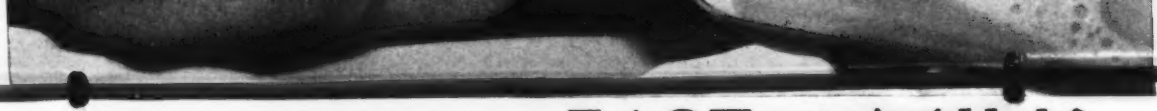
Agents for Kinetic's "Freon-12"

ANSUL CHEMICAL COMPANY • MARINETTE, WISCONSIN

LET THE ANSUL JOBBER NEAR YOU SERVE YOU BETTER

RS-26

Food *and* Food Preservation
Will Help Win This War, *too*...



Bacteria Multiply *FAST in* MILK..
without Refrigeration

Disease lurks in bacteria-laden Milk, and the one effective safeguard against these bacteria is REFRIGERATION!

HEALTH is one of the Nation's FIRST WAR NEEDS . . . REFRIGERATION is the first essential to maintenance of that Health. For only through modern Refrigeration can the proper foods be delivered to the dinner table, to restaurants, hotels, army camps, navy cantonments, battleships — delivered safely, quickly, with all their health-giving vitamins preserved and protected.

A-P DEPENDABLE VALVES are more important today than ever before. In their ability to assure service-free refrigerant control, they help keep Refrigeration Equipment operating at its best, with a minimum of replacement and maintenance expense, for sure protection of the Nation's perishable foods.

Progressive Service Engineers Use and Recommend — and Aggressive Jobbers Stock and Talk A-P Products.

AUTOMATIC PRODUCTS COMPANY
2464 NORTH THIRTY-SECOND STREET
MILWAUKEE WISCONSIN
Export Department 100 Varick Street, New York City

Manufacturers of DEPENDABLE *Refrigerant Valves*

FOR BETTER TUBING CONNECTION WORK USE —

IMPERIAL

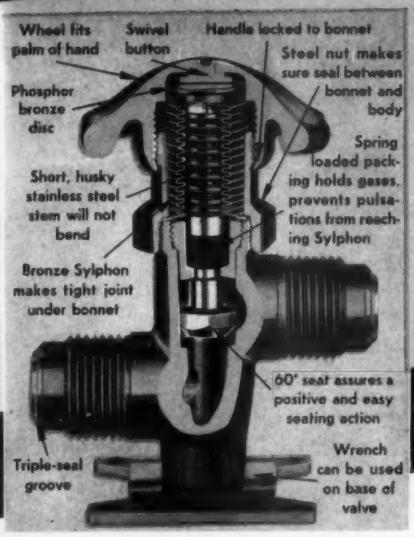
- TRIPLE-SEAL FITTINGS
- SYLPAK VALVES
- AND IMPERIAL TOOLS

TRIPLE-SEAL GIVES YOU THESE IMPORTANT FEATURES

The "Triple-Seal" groove is an exclusive feature on all Imperial Refrigeration Flared Fittings. When the flare is drawn up against the groove in the seat the copper is actually extruded into the groove. You get a tight, self-seating joint without danger of twisting the tubing or shearing off the flare. Even when the seat is nicked you can still make a tight joint. You can reconnect as often as you wish.

Flats are placed on elbows and tees. This gives a wrench hold, eliminating the possibility of distorting the body in gripping the fitting, and also speeds up work materially.

Tees, elbows, crosses and nuts are made from brass forgings. This assures a fine grain structure, freedom from internal stress and a high tensile strength. It eliminates any possibility of seepage of refrigerant or cracking or splitting.


Wheel fits palm of hand
Swivel button
Handle locked to bonnet
Steel nut makes sure seal between bonnet and body
Phosphor bronze disc
Spring loaded packing holds gases, prevents pulsations from reaching Sylphon
Short, husky stainless steel stem will not bend
Bronze Sylphon makes tight joint under bonnet
60° seat assures a positive and easy seating action
Triple-seal groove
Wrench can be used on base of valve

You need the double security of SYLPAK VALVES

THE NEXT TIME SPECIFY SYLPAK AND BE SURE!

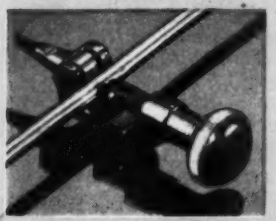
HERE is a valve that offers the double security of the Sylphon bellows plus a good spring-loaded packing. It stands up under pulsations, vibrations and excess pressure.

These valves are available for tube diameters from ¼" to ¾" for S.A.E. or solder fittings as desired. Sylphon type valves can also be furnished in sizes up to 1½" female I.P.T. and 1⅝" O.D. tube size.

With IMPERIAL TOOLS

you can make tight connections that stay tight!

Imperial has developed quite a number of tools that are used by installation and service men everywhere. We show here three of these tools that should be in the kit of anyone who has the job of connecting up tubing.



• **Tube Cutter No. 174-F** will cut 3/16" to ¾" O.D. quickly and easily. Makes a clean, right angle cut, leaving no chips or burrs and does not flatten the tube. Forged brass body, polished chromium plate finish.

• **Tube Bender No. 364-F** made in sizes 3/16", ¼", 5/16", ⅜", ½", ⅝" and ¾" tubing. A one piece, open side bender; for making bends at end or any part of tubing. Handy where tubing has been partially connected. Bends to any angle up to 180°. Constructed of steel; light in weight; extremely rugged and durable.

• **No. 175-F Flaring Tool** makes it easy to flare tubing without cracking or splitting. Yoke is self-centering. Flares 3/16", ¼", ⅜", ½", ⅝", and ¾" O.D. tubing.

For other sizes and types of tools see your Jobber or write for catalog.

THE IMPERIAL BRASS MANUFACTURING COMPANY

1204 WEST HARRISON STREET • CHICAGO, ILL.

BULLS·EYE OIL GAUGE
On All Par Models!!!

No squat, no stoop, no kneeling—to check the oil supply in a PAR unit. No, you don't have to tear it apart to check the oil . . . the bullseye sight gauge gives you a constant check on oil level.

And three-ring pistons insure maximum efficiency—less friction . . . lower operating temperatures . . . maximum economy. These are typical features of PAR's thorough-going engineering.

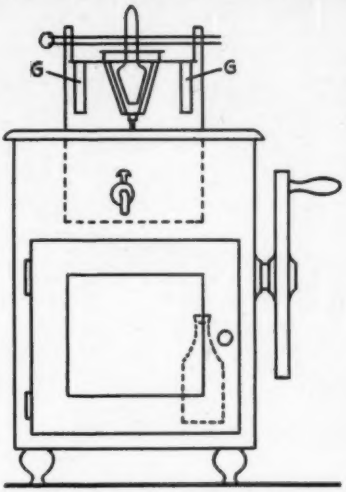
PAR
Refrigeration Equipment

See your jobber's display of PAR equipment . . . or write the factory for your copy of the FREE PAR CATALOG—a manual for service engineers!

MODERN EQUIPMENT CORP., DEFIANCE, OHIO

★ ★ **FOOD**—THE FIRST LINE OF DEFENSE . . . CONSERVE IT WITH REFRIGERATION! ★ ★

REFRIGERATION HAS COME A LONG WAY



From "The Ice Book"
by Thomas Masters

ICE CREAM FREEZER
(1844)

Thomas Masters of London designed a snappy mahogany-cased, triple-purpose ice cream freezer that also made ice. Freezing temperatures were produced by "Frigorific" mixtures, chemical mixtures such as ammonium sulfate, ammonium nitrate and water. Ice formed in cans marked "G" was removed and stored in the lower compartment for the cooling of beverages.

1941 Today Virginia Refrigerants play an important role in the ice cream industry. For maintenance of correct hardness and texture in cabinets at the point of sale, service engineers rely on Virginia for top performance.

BUY YOUR KINETIC'S FREON-12* via VIRGINIA
*Reg. U. S. Pat. Off.

EXTRA DRY ESOTOO · Methylene Chloride · V-METH-L

VIRGINIA SMELTING CO.

Located at tidewater
WEST NORFOLK, VIRGINIA

V VIRGINIA

THERMO EXPANSION VALVES

Type B—Thermo Valve. ¾ ton Freon, 1 ton Methyl Chloride.

Type THL—Thermo Valve. 50 tons Freon, 100 tons Methyl Chloride.

Type TG—Thermo Valve. From 1 to 19 tons Ammonia.

Type FR4—Thermo Valve. From 26 to 80 tons Ammonia.

THE COMPLETE ALCO LINE

Covers the Field of Refrigerant Control

● Whatever your requirements in the wide field of refrigerant control, there is an Alco Valve that correctly meets the demands of the job. From the smallest to the largest air conditioning or refrigeration installations, the proper Alco engineered refrigerant control will materially contribute to the efficiency of the system.

You'll find proof of Alco's leadership in the performance record of thousands of Alco Valves in operation on every type of installation throughout the world today. Alco Valves, plus Alco's engineering experience and extensive knowledge of control problems provide a combination that is second to none in the entire industry.

The complete Alco Line includes Thermostatic Expansion Valves, Automatic Expansion Valves, Magnetic Stop Valves, Evaporator Pressure Regulators, Float Switches and Float Valves — in a wide variety of types, sizes, and capacities.

Alco offers you the most accurate, dependable refrigerant controls available today—designed for long life and completely satisfactory service.

ALCO VALVE COMPANY, 2630 Big Bend Blvd., St. Louis, Missouri

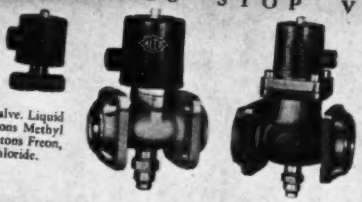
EVAPORATOR PRESSURE REGULATORS

Type EPR — All Refrigerants. Port sizes up to 2 inches.

FLOAT SWITCHES

Type J - Liquid Level Control for All Refrigerants.

MAGNETIC STOP VALVES



Type S1—Magnetic Valve. 3 tons Liquid Freon, 6 tons Liquid Methyl Chloride.

Type R—Magnetic Valve. Liquid —35 tons Freon, 70 tons Methyl Chloride. Suction—9 tons Freon, 18 tons Methyl Chloride.

Type SP—Magnetic Valve. 3 tons Liquid Ammonia.

Type R — Magnetic Valve. Liquid—172 tons Ammonia. Suction—28 tons Ammonia.

ALCO *Engineered Refrigerant Controls*

FOR HIGHEST EVAPORATOR EFFICIENCY

FAMOUS HENRY "FIRSTS"

1. The Packless Valve with Ports-in-Line and Balanced-Action.
2. The Wing Cap Valve with Steel Companion Flanges and Separable Brass or Steel Sleeves.
3. The Automatic Pressure Relief Valve with Push Rod for Emergency Re-seating.
4. The Permanent-Mold Iron Compressor Shut-off Valve.
5. The Distortion-Proof Flange for Dryers and Strainers.
6. The One-Piece Drawn Brass Shell for Dryers and Strainers.
7. The Welded Steel "Y" Strainer.
8. The Abso-Dry Pressure Sealed Dehydrator.
9. The Dispersion Tube for Dryers.
10. The Dehydra-tector—the Dryer with the Built-in Liquid Sight Port.

You Can Count on Henry for More "Firsts" in the Future!

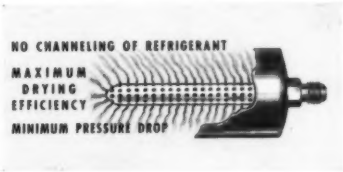
ABSO-DRY PRESSURE SEALED DRYERS

A Henry Dr... ...a Hiss.

For Refrigeration and Air Conditioning Systems Using Freon, Methyl Chloride, Sulphur Dioxide, etc.

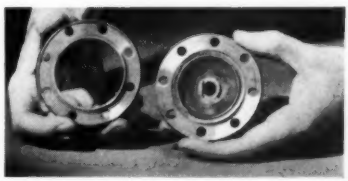
FACTORY PRESSURE SEALED DRYERS *(Process Patents Applied For)* . . . By means of an exclusive process of manufacture, Henry not only positively removes every trace of moisture from the dryer but also provides positive indication that there are no leaks in the unit and that no absorption of moisture has taken place up to the point of actual installation. When the seal cap at the inlet end of a new Henry Dryer is removed, prior to installation, there is a hissing sound, due to the ESCAPE of dehydrated air indicating that there are no leaks and that the dehydrant is absolutely dry.

Advantages of Patented Dispersion Tube.



OTHER FEATURES OF HENRY DRYERS . . . Compression spring maintains uniform tension on dehydrant at all times, compensates for changes in volume and minimizes formation of small particles. Soldered or Flanged Shells—models are available with either soldered cap or flanged end shells. Shells not exceeding 5½" in length are drawn in dies, so that they have only one joint. Choice of the two most efficient and popular dehydrants: Silica Gel and Activated Alumina. Other dehydrants special to order.

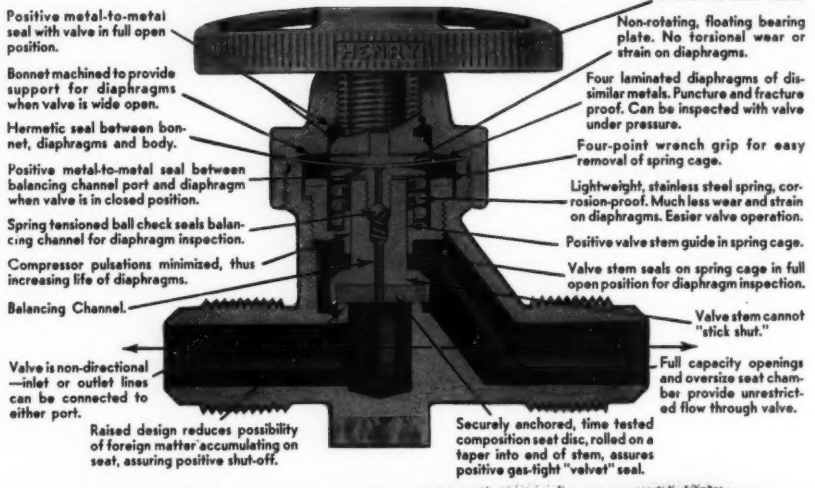
Flanges used on Henry Dryers are Distortion Proof. This same type construction is used on flanged type strainers described elsewhere in this insert.



HENRY *Balanced Action* DIAPHRAGM

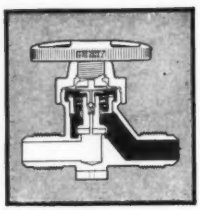
PORTS IN LINE • OVAL HAND WHEEL • LONGER LIFE

24 IMPORTANT FEATURES OF DESIGN, CONSTRUCTION AND OPERATION . . . . .

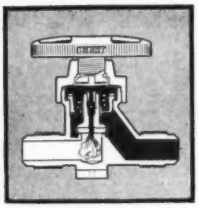

Positive metal-to-metal seal with valve in full open position.
Bonnet machined to provide support for diaphragms when valve is wide open.
Hermetic seal between bonnet, diaphragms and body.
Positive metal-to-metal seal between balancing channel port and diaphragm when valve is in closed position.
Spring tensioned ball check seals balancing channel for diaphragm inspection.
Compressor pulsations minimized, thus increasing life of diaphragms.
Balancing Channel.
Valve is non-directional —inlet or outlet lines can be connected to either port.
Raised design reduces possibility of foreign matter accumulating on seat, assuring positive shut-off.
OVALINE hand wheel.
Non-rotating, floating bearing plate. No torsional wear or strain on diaphragms.
Four laminated diaphragms of dissimilar metals. Puncture and fracture proof. Can be inspected with valve under pressure.
Four-point wrench grip for easy removal of spring cage.
Lightweight, stainless steel spring, corrosion-proof. Much less wear and strain on diaphragms. Easier valve operation.
Positive valve stem guide in spring cage.
Valve stem seals on spring cage in full open position for diaphragm inspection.
Valve stem cannot "stick shut."
Full capacity openings and oversize seat chamber provide unrestricted flow through valve.
Securely anchored, time tested composition seat disc, rolled on a taper into end of stem, assures positive gas-tight "velvet" seal.

INCLUDING { • Forged brass valve body and bonnet • Hexagonal wrench grip on valve bonnet • Wrench flats on valve body facilitate removal of bonnet and internal parts for inspection or line soldering • Rigid mounting flange integral with body forging • Inlet and outlet ports in-line — on two-way and three-way valves eliminating tube bending and making it easier to install heater lines

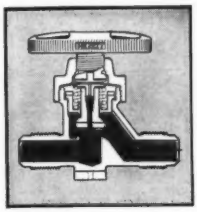
BALANCED-ACTION SIMPLY EXPLAINED



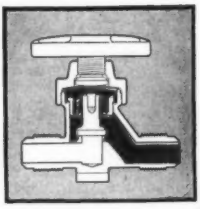
BALANCED-ACTION VALVE IN CLOSED POSITION — High pressure above the seat, low pressure below the seat. High pressure regions are shown in color. Pressure in spring cage below diaphragms is the same as that in main passage of valve body above the seat. This is due to seepage between the lower stem and the guide. Downward pressure of the bearing plate on the diaphragms seals the upper port of the balancing channel.



OPENING THE BALANCED-ACTION VALVE — As hand wheel is turned to open valve the diaphragms, because of pressure beneath them and their own snap action, rise and expose the upper port of the balancing channel. The high pressure, shown in color, unseats ball check and is instantly released through the open channel to the low pressure region below the valve seat, thus achieving "balanced - action" by equalizing pressures.



BALANCED-ACTION VALVE IN FULL OPEN POSITION — Equalization or balancing of pressures above and below the seat, as shown in color, guarantees that this valve can never "stick shut" but will always open positively, regardless of original differential in pressures. When there is high pressure below seat and low pressure above, the balanced valve opens easier than other types because of the light weight spring.



CONVENTIONAL TYPE WITHOUT BALANCED-ACTION — As hand wheel is turned to open valve the diaphragms rise. When the differential between high pressure, shown in color, above seat and low pressure below seat is greater than force exerted by heavy spring, stem "sticks shut" — valve remaining closed. The heavy spring required in this type of valve greatly increases diaphragm wear and strain and causes stiff closing.

PACKLESS VALVES

Available in two-way, three-way, and angle types; shut-off and needle-point or hand expansion; S.A.E. flare, O.D. solder, or female pipe thread connections.

★ Henry Balanced-Action Diaphragm Packless Valves are the only valves combining 24 necessary and important points of superiority, which have proved so valuable for air conditioning and refrigeration. These 24 features mean lower cost through easier installation and longer valve life.

A balanced-action valve *cannot stick shut* regardless of the pressure differential above and below the seat.

The valve is *non-directional*—inlet and outlet lines can be connected to either port.

Light weight stainless steel spring causes *less wear and strain on diaphragms* and permits easy opening and closing with very slight force exerted on hand wheel.

Longer diaphragm life is due to non-rotating floating bearing plate in upper stem eliminating torsional wear and strain. Light weight spring also reduces wear and strain. Four laminated *puncture-and-fracture-proof diaphragms* of dissimilar metals: the top diaphragm is phosphor bronze for greater wear; the bottom diaphragm is stainless steel to eliminate corrosion; the two inner diaphragms are special soft bronze, providing self-sealing action.

Snap Action Diaphragm Relief Valve with extended female solder connections which prevent heat of installation from damaging internal parts. Available also with female pipe thread connections.

PATENTS PENDING

SNAP ACTION DIAPHRAGM RELIEF VALVE

Instantaneous pressure relief, fast, positive reseating action and very small differential between opening and closing pressures are the features of this design which incorporates diaphragm construction and an unusual seating arrangement. This is the ideal valve for protecting a system containing a substantial charge of refrigerant, because of its design features and positive performance characteristics.

Used in relieving from either high side or low side to the atmosphere or from high side to low side of system. A plate on valve body is stamped with the initial leak pressure setting in pounds per square inch and the discharge capacity of the valve expressed in pounds of free air per minute. Inlet is at side of valve; outlet is at bottom.

Approved for use under Refrigeration and Air Conditioning Safety Codes for Relief of

HENRY PERMANENT-MOLD IRON, BACK-SEATING, FLANGED, COMPRESSOR SHUT-OFF VALVES

U. S. PATENT NUMBER 1,851,035 AND OTHER PATENTS PENDING

Permanent-mold iron non-porous body is cast in air cooled steel mold; it is seepage proof and smooth in appearance. Smaller sizes have positive sealing gasketed end connections. Large sizes have two-piece companion flange end connections. Larger valves have self-aligning swivel stem disc seating directly in valve body producing positive closing action with minimum pressure exerted on the stem.

WING CAP PACKED VALVES

NON-FERROUS ALLOY AND SEMI-STEEL TYPES

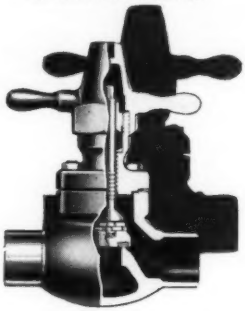
Equipped with our patented rotating, self-aligning stem disc. Resilient packing developed especially for Freon and Methyl Chloride. These valves are back-seating, thus permitting repacking under pressure. Wing cap can be inverted and its socket used to operate valve. No special wrench is necessary. Added protection against leaks is provided by cap, forming tongue-and-groove, recessed-gasket joint with bonnet. Long stem travel between closed and wide open positions and full capacity passages insure unrestricted flow through valve.

The NON-FERROUS ALLOY valves have solder connections machined directly in the valve body. The bonnet is fastened to the body with studs and nuts. Relatively compact in design and light in weight.

SEMI-STEEL valves are available with screw ends in which solder adapters can be inserted. Valves also furnished with companion flanges complete with solder sleeves, bolts and gaskets. Valves 1¼" and over have bolted bonnets. Smaller sizes have screw bonnets.

NON-FERROUS ALLOY and SEMI-STEEL valves can be furnished with solder connections for iron pipe size tubing.

U.S. PATENT NO. 1,693,032
AND OTHER PATENTS PENDING



NON-FERROUS ALLOY valve which meets all government specifications.

STRAINERS, FILTERS and SCALE TRAPS

There is a size and type of Henry Strainer for every installation requirement. Compact design and exceptionally large screen area assure maximum capacity and long service before cleaning is necessary. Most Henry Strainers have a single joint brass shell, drawn in a die, with either a forged steel distortion-proof clean-out flange or a soldered brass cap, at inlet end. All screens are securely anchored. Negligible pressure drop.

OTHER HENRY PRODUCTS

Ammonia Charging Connections and Flexible Lines

Check Valves	Manifolds
Compressor Valves	Purge Valves
Dehydrants	Receiver Valves
Expansion Valves	Relief Valves
Gauge Glass Assemblies	Shut-off Valves

Split Return Bends

Recommended and Sold by Leading Jobbers

HENRY VALVE COMPANY

1019 NORTH SPAULDING AVENUE • CHICAGO, ILLINOIS

WRITE FOR LATEST CATALOGS

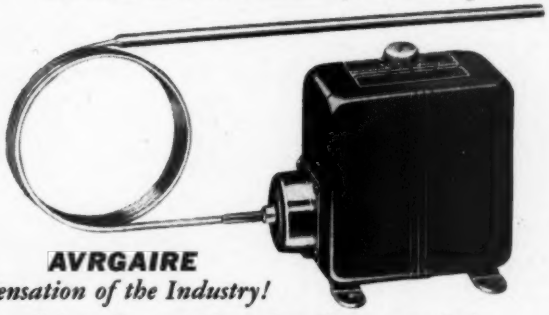
Again in 1942 Depend on Penn

Refrigeration and Air Conditioning are vital to the nation's well-being and safety. For the efficient operation of both, you can again depend on Penn Automatic Controls.

Food is one of the most important sinews of war. And to conserve America's food supply requires mechanical refrigeration—in warehouses, commissaries, stores and markets, as well as in homes.

In scores of industries, now turning out war materials, air conditioning is—not a mere luxury for comfort—but a vital necessity upon which the production processes themselves depend.

Whatever your need in refrigeration controls... choose the exact type to fit the job from Penn's complete line. In the face of extraordinary demands on our facilities, we shall bend every effort to keep deliveries and service as nearly normal as possible.



AVRGAIRE

Sensation of the Industry!

For walk-in coolers, reach-in coolers, display cases, florist boxes and all above-freezing applications... this new Penn Control has won instant and widespread acceptance by its extraordinary service. AVRGAIRE maintains temperatures within narrow limits without erratic short cycling...provides selective defrost...and accurate humidity control.

Penn Electric Switch Co., Goshen, Ind.

★

PENN HELPS THE NATION ARM By the manufacture of specialized control devices for the U. S. Army and Navy, and Defense Industries.

★

PENN CONTROLS

REFRIGERATION AIR CONDITIONING ENGINE HEATING PUMPING AND AIR COMPRESSOR

SAFEGUARD
America's Food Supply!

★ KEEP fit --- with healthful, wholesome food! America's strength lies in her steel and ships and military resources --- and in the muscle and morale of every American citizen!

★ Modern Refrigeration is a vital requisite to a sound defense program --- and Ranco is proud to be playing its part in safeguarding the food supplies that keep America strong and fearless.

★

Ranco INC.
COLUMBUS, OHIO, U.S.A.

TYPE 91G2

TYPE 0

TYPE RJS-830

The Refrigeration Service Engineer

Vol. 10 No. 1

January, 1942

A Monthly Illustrated Journal Devoted to the Interests of the Refrigeration Service Engineer in the Servicing of Domestic and Small Commercial Refrigeration Systems and Oil Burners

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MANPOWER AND MATERIALS
KEYS TO NATIONAL DEFENSE
-they must be conserved

Defense requirements must come first. Demands are heavy—will be heavier—and they must be met. Hence, it is a patriotic duty to conserve manpower and materials—the twin keys to National Defense.

In laying out refrigeration and air conditioning installations, it is necessary to consider these factors. As the army grows—capable service men will be fewer—the answer is equipment that requires minimum service. If equipment is ineffective and has to be replaced, added and unnecessary loads are thrown on production machines needed for turning out military supplies. Additional materials must be used which may be needed elsewhere. Select equipment that won't have to be replaced.

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Thermostatic
Expansion Valve

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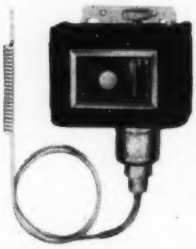
Solenoid Valve



No. 450 ZL-1
Temperature Control

DETROIT LUBRICATOR COMPANY

General Offices: DETROIT, MICHIGAN

Canadian Representatives—RAILWAY AND ENGINEERING SPECIALTIES LIMITED, Montreal, Toronto, Winnipeg

The Refrigeration Service Engineer

Vol. 10, No. 1 CHICAGO, JANUARY, 1942 $2.00 Per Annum

"1942 Will Reward Fighters"

THE above slogan is not original with us, but we like it because it is a direct challenge to each of us. Regardless of our employment in industry or serving in the armed forces, there are times ahead which will test the courage and fiber of the stoutest. Today no one's effort is too inconsequential to help bring about the desired results. It is the sum total of all of our efforts that will spell the final victory.

"1942 will reward fighters"—but it will take those who have the intestinal fortitude, to squarely face realities. *We will have to do much more with less.* To those engaged in the maintenance and servicing of refrigeration equipment, a job of tremendous responsibility is theirs. Refrigeration for food preservation is a vital contribution to the health and morale of not only the civilian population whose productive capacity is scheduled to exceed anything the world has known, but to the armed forces whose responsibility is to see that the victory is decisive. It is the responsibility of the service and maintenance engineer to see that this vital protective food line is not interrupted. Many of the materials heretofore considered indispensable must be conserved and possibly eliminated. But regardless of the handicaps the important thing is *that the job must be done.*

The government is fully cognizant of the position that the refrigeration industry occupies. It is expected that orders now being formulated will assure the necessary supplies and materials to do the maintenance job. However, there is no substitute for experience and it is during this period that the ability and ingenuity of the experienced service and maintenance engineer will be demonstrated.

Some conception of the food preservation program anticipated can be pictured when it is considered that under lease-lend arrangements the United States has undertaken to supply Great Britain all the perishable protein and "protective" food it needs. That part of our obligation augments the food demand on our existing facilities by an estimated 20,000,000 persons. It is to be expected such aid will be extended to Russia which would add another estimated demand equivalent to probably 50,000,000 persons.

We have been repeatedly told that the food problem today is an increase in the production and preservation of foods of high nutritive value, principally perishables. It is a big undertaking and the refrigeration service and maintenance field must do its important part.

Operation of the Gale Equalizer and Fluid Cooled Condenser

Two new features of the Gale refrigerator should prove most interesting to the service field. They present a logical cure for some of the short comings of the standard capillary tube system.

IN the conventional static condenser capillary tube type of refrigerating system, there are a number of shortcomings; until now, no practical means of overcoming them have been found. Some of these shortcomings are: (1) Relatively small amount of air passing over the condenser. (2) High internal volume in the condenser, because: (a) since there is no fan, a larger surface is needed to dissipate the heat, and (b) the gas has to remain in the condenser longer in order to be condensed. (3) Cost of this excessive surface. (4) Hot gas is bled through capillary into the evaporator as soon as the compressor shuts off at the end of each cycle. (5) At the beginning of each new cycle, hot gas is bled into evaporator until condenser pressure is restored. (6) Time required to replace condensing head pressure. (7) Relatively dry condition at the end of the evaporator necessitated in order to prevent liquid refrigerant filling up surge chamber and splashing down suction line. (8) No liquid refrigerant stored ahead of evaporator during the off period, ready for the new cycle. (9) Excessive head pressure, wattage, and long run required when system is started up after prolonged off period. (10) Compressor pulls down too quickly to a low operating back pressure at the start of each run.

The Fluid Cooled Condenser

The new Gale fluid cooled static condenser is designed to overcome all these disadvantages. It is an accepted fact that a water cooled condenser is much more efficient than an air cooled one. Water cooled condensers are not at present being used in household refrigerators because of the additional cost required to build them and furnish the proper control valves, and also because plumbing connections would be required at the time of installation. The new Gale fluid cooled static condenser is virtually a water cooled condenser, but instead of taking on fresh water and discharging it into the sewer mains after it has been warmed up, this condenser stores the hot water, which has chemicals added to prevent freezing and corrosion, in a reservoir during the running cycle, cooling it during the off cycle, ready to be re-used.

However, the fluid is partially cooled before reaching the reservoir, because as it passes through the fin tube surrounding the refrigerant tube, it gives up what heat it can to the air. The remainder of the heat is retained in the fluid, which circulates into the reservoir. When the compressor shuts off and heat is no longer being given up by the refrigerant tube, the fluid circulates back out into the fin tubes and cooling is continued until the initial temperature is reached.

As is shown in Fig. 1, the refrigerant tube passes through the fluid tube, which carries the heat dissipating fins, and the fluid tube is connected to the reservoir in such a way as to take advantage of the principle of thermo-syphoning, to give it the required circulation. As the heat is being given off by the refrigerant tube, it is picked up by the fluid surrounding it, which in turn dissipates by means of the fins that amount of it which the air can carry off without necessitating higher head pressures in order to obtain a higher condenser temperature. The rest then circulates into the reservoir, because as the fluid surrounding the tube is heated, it flows from the tube into the top of the reservoir, forcing the cool fluid out the bottom into the tube. Then after the compressor shuts off, the hot fluid in the tube cools down, and the circulation is reversed; it now flows out of the tube into the bottom of the reservoir, forcing the hot fluid out the top.

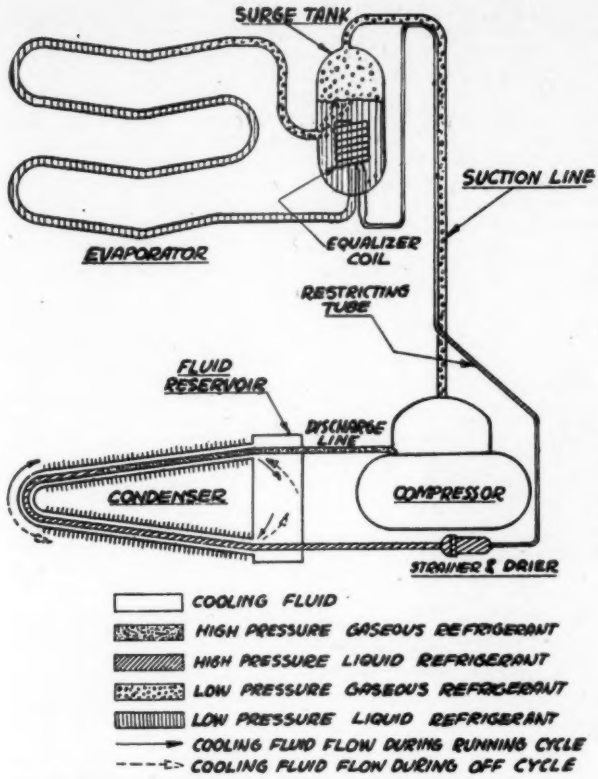


Fig. 1—The new Gale system employing a fluid cooled condenser and an equalizer coil. The compressor is hermetically sealed and the refrigerant control is a capillary tube.

In the conventional system, in order to give up this additional heat during the run, the air passing over the condenser would have to be heated to a higher temperature, which could only be obtained by a combination of an increase in condenser surface and volume and an increase in condenser temperature. This increase in condenser temperature could only be brought about by an increase in head pressure. Therefore, it may be readily seen that a definite saving in power input to the compressor is effected in this system.

Since the air picks up the heat so slowly from the conventional static condenser, not only a large surface area is required, but also a high internal volume, in order to allow the gas time to dissipate its heat. Since the fluid has a very high specific heat and extremely high density in comparison to air, the heat from the refrigerant tube in the fluid cooled condenser can be dissipated very rapidly to the fluid, and the unit permitted to shut off, while this same heat is then being dissipated to the air. Since this heat can be so quickly carried away from the refrigerant itself, only a very small internal volume in the condenser is necessary, actually only about one fifth of that required in the conventional system. This means that even if this system did not have the equalizer, only one fifth as much hot gas could possibly be bled into the evaporator when the compressor shuts off, and only one fifth as much bled in during the start of the new cycle and that the condenser pressure would be restored five times as fast as in the conventional system. This would naturally represent a considerable saving, because all heat which is blown into the evaporator must again be pumped out and the volume of gas which is bled out of the condenser must again be replaced at the start of the new cycle, before sufficient pressure can be built up to cause new liquid refrigerant to be condensed.

The Equalizer

But even though only one fifth as much hot gas is bled off from the condenser at the end of each run and the beginning of each new run, the equalizer prevents even that from ever entering the evaporator. The equalizer consists of a coil located between the restricting device and the evaporator, and it is placed in the surge chamber which separates out the liquid refrigerant passing completely through the evaporator from the gas leaving the evaporator.

When the hot gas (which cannot be condensed in the condenser because the compressor is no longer in operation) passes through the restricting device, it enters the equalizer coil and is condensed by the low temperature liquid refrigerant, surrounding the equalizer coil. It then passes into the evaporator in the liquid state. In being condensed in the equalizer, it gives up its heat to the liquid refrigerant which surrounds it, and since this surge chamber is connected between the evaporator and the suction line to the compressor, the gas formed in the surge chamber in condensing the gas in the equalizer is communicated directly to the suction line. It can be readily seen that, therefore, the heat contained in any gas passing through the restricting device is thermally by-passed directly to the suction line. Thus it does not have to pass completely through the evaporator, and then to the suction line, in this way decreasing the effective evaporator surface and blowing ahead of it a good portion of the liquid refrigerant which would otherwise remain in the evaporator to be used during the off cycle to absorb heat from the cabinet, thus decreasing the off cycle.

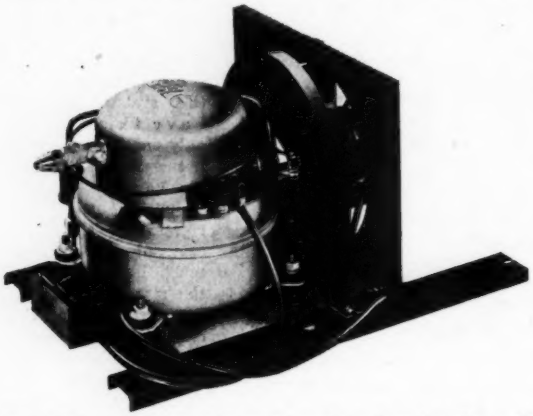


Fig. 2—The standard type of air cooled condenser is used on this model of the Gale unit. It will be noted that service valves are included in the unit.

It can also be seen that at any time, due to a sudden load, any uncondensed refrigerant passes through the restricting device, it is condensed before entering the evaporator, and its heat is by-passed directly to the suction gas going to the compressor.

Bonding the restricting device to the suction line does not satisfactorily perform the above described heat by-passing operation, because only relatively dry gas is passing through the suction line, while the equalizer coil is submerged in low pressure liquid refrigerant.

During the off cycle, after the pressure in the condenser has been equalized with that in the evaporator, the pressure in the equalizer coil is identical with the pressure in the surge chamber surrounding it. The laws of thermodynamics state that for any given pressure, a liquid will evaporate at only one temperature. The pressure in the equalizer coil, since it is connected to the entrance to the evaporator, is always equal to the pressure in the surge chamber, which is connected to the other end of the evaporator; therefore the evaporating temperature of the liquid refrigerant in the equalizer is always equal to the evaporating temperature of that in the surge chamber, during the off cycle.

This means that the liquid contained in the equalizer coil cannot be evaporated during the off cycle, because it is impossible to raise the temperature of the liquid surrounding the equalizer coil above the evaporating point of the liquid contained in the equalizer coil. Any increase in temperature in the surrounding liquid would create an increased pressure, which would be transmitted through the evaporator to the equalizer coil, causing the temperature at which it would evaporate to be raised to that of the surrounding liquid. Since this liquid cannot evaporate during the off cycle, it is obvious that it is ready to enter the evaporator immediately upon the start of the new cycle. This means that at the start of each new cycle, instead of a high volume of gas being blown into the evaporator as occurs in the conventional system, liquid refrigerant enters the evaporator, replacing that gaseous refrigerant which is being removed from the evaporator by the compressor. This, in turn, causes the evaporator to immediately commence absorbing heat from the cabinet, and maintains a high operating suction pressure during the first part of the cycle, which permits the compressor to run much more efficiently.

In the conventional system, the suction pressure is reduced very rapidly at the start

of each cycle, before liquid refrigerant can be supplied. At low suction pressures, the compressor operates less efficiently and with less capacity because it is pumping a gas which is less dense, yet its friction losses are practically equal to those of high suction pressure operation. Therefore, by the time liquid refrigerant is being supplied to the evaporator, the compressor is operating at an inefficient point. The result is that the liquid, when it is supplied, is not supplied in as great a quantity as it is in the equalizer system, which maintains this suction pressure high at the start until new liquid can be condensed.

Since during the running cycle of the compressor there is always a certain degree of pressure drop across the evaporator, the temperature of the liquid refrigerant in the surge chamber and in the last portions of the evaporator is lower than the temperature of that in the first portion. In the equalizer system this lower temperature liquid supercools the liquid in the equalizer coil, causing the first portion of the evaporator to operate at a temperature equivalent to that of the last portion.

In the conventional system the only amount of liquid refrigerant which can be allowed to splash out of the evaporator into the surge chamber is that amount which can be evaporated off by the surface of the surge chamber. If more splashes over it would fill up the surge chamber and splash over into the suction line. To avoid this, the last portion of the evaporator surface must be operated partially as a dryer coil. In the system with the equalizer, this portion of the evaporator is operated more completely filled. Additional liquid refrigerant can be splashed into the surge chamber, since it will be used in conditioning the refrigerant in the equalizer coil. This does not represent a loss, because its refrigerating ability is transmitted to that refrigerant entering the evaporator by supercooling the refrigerant in the equalizer coil. In effect the evaporator can operate more completely filled with liquid refrigerant which causes it to operate much more efficiently.

When a refrigerator of the conventional system is started up in a hot room, after a prolonged off period, the evaporator (because of the high temperature inside the cabinet) picks up the heat far more rapidly than the unit can handle it. This is because the evaporator surface is designed to operate in cabinet temperatures of 45 degrees and under. When operating with a high cabinet temperature, 100 degrees for example, at the start, it picks up more heat than the compressor can handle. The amount of heat actually contained in the cabinet and in the insulation is not so high, but the difficulty arises because it is given up to the compressor too rapidly for the compressor and condenser to dissipate it. The result is a very high head pressure and wattage. In a number of cases, this overload actually causes the refrigerating system to shut off repeatedly. The hot gas coming down the suction line heats up the restricting device bonded to it, to such a point that a terrifically high head pressure is required to prevent actual vaporization in the restricting device.

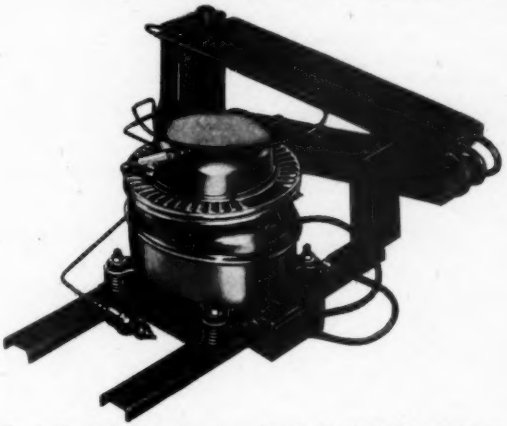


Fig. 3—The Gale hermetic unit equipped with the fluid cooled condenser. The condenser is a double tube type with the refrigerant tube on the inside.

In the equalizer system, the suction gas leaving the evaporator passes over the equalizer coil, which during these conditions is the part of the system where the first expansion takes place. The result is that the high superheat of the suction gas is removed, and the restricting device is kept cool, permitting liquid to pass through it without the high head pressure that is required when it is heated up. Since a certain amount of heat is picked up in this

equalizer coil, less heat will be picked up from the evaporator surface. This in effect reduces the evaporator capacity to that which the unit can handle. Then as rapidly as refrigeration is not needed at the suction side of the evaporator, this refrigerating capacity goes on into the evaporator and adds to the effective surface, which no longer will cause an increased load, because the temperature surrounding the evaporator is down to designed conditions.

Even though the evaporator operates with less effective surface at the start of the pull down cycle, the cabinet temperature is brought down more quickly and the unit cycles more quickly than in the conventional system, because the unit has been permitted to operate under designed conditions rather than under such terrifically heavy loads. It is virtually the same as putting a car in low when starting it up, rather than trying to start in high. Actual tests show that instead of the suction pressure pulling down to normal operating conditions in a considerable length of time, as is the case in the conventional system, the equalizer causes it to drop to designed conditions in thirty seconds. This enables it to have a peak head pressure of only 52% and a peak wattage of only 48% of that found in an identical system without the equalizer coil.

Since the extremely high loads are not encountered during the pull down, a compressor motor having a horsepower rating equivalent to the normal cycling load condition may be used in place of a larger motor which would be required for this pull down condition only and then would operate at far below the rated capacity. Since the electric motor operates at maximum efficiency during full load conditions, the equalizer system provides an increase in running efficiency.

Service De Luxe on a Bicycle

Tire Rationing Forebodes Some Hardships

THE Office of Price Administration issued Order No. M-15-C to restrict transactions in new rubber tires, casings and tubes on December 27, 1941. This order lists in the following excerpt those classifications which are eligible to purchase new tires:

LIST A—ELIGIBILITY CLASSIFICATION

List of Vehicles Which May Be Equipped With New Rubber Tires, Casings, or Tubes

No certificate shall be issued unless the applicant for the certificate certifies that the tire, casing or tube for which application is made is to be mounted:

(a) On a vehicle which is operated by a physician, surgeon, visiting nurse, or a veterinary, and which is used principally for professional services.

(b) On an ambulance

(c) On a vehicle used exclusively for one or more of the following purposes:

(1) To maintain fire fighting services;
(2) To maintain necessary public police services;
(3) To enforce such laws as relate specifically to the protection of public health and safety;
(4) To maintain garbage disposal and other sanitation services;
(5) To maintain mail services.

(d) On a vehicle with a capacity of ten or more passengers, operated exclusively for one or more of the following purposes:

(1) Transportation of passengers as part of the services rendered to the public by regular transportation system;
(2) Transportation of students and teachers to and from school;
(3) Transportation of employees to or from any industrial or mining establishment or construction project, except when public transportation facilities are readily available.

(e) On a truck operated exclusively for one or more of the purposes stated in the preceding sections or for one or more of the following purposes:

(1) Transportation of ice, and of fuel;
(2) Transportation of material and equipment for the building and maintenance of public roads;
(3) Transportation of material and equipment for the construction and maintenance of public utilities;
(4) Transportation of material and equipment for the construction and maintenance of production facilities;
(5) Transportation of material and equipment for the construction of defense housing facilities and military and naval establishments;
(6) Transportation essential to render roofing, plumbing, heating and electrical repair services;
(7) Transportation by any common carrier;

(Continued on page 35)

COMMERCIAL

INCREASE BUSINESS BY DOING A MORE EFFECTIVE JOB OF SELLING *Selling*

Twelve Separate Refrigeration Units Needed in This Restaurant

By Robert Latimer

WHEN John H. Katsina, restaurant operator of Springfield, Illinois, planned a novel new type of combination restaurant and cocktail lounge in the same building, the question of refrigeration and air conditioning for three highly-different departments became a major problem.

The building in which the Katsina Cafe is located resembles a Pullman car, 160 feet long by only 18 feet wide. At the front is a 40 foot bar; in the center a restaurant, soda fountain and lunch counter seating 120 patrons; and in the rear, a cocktail lounge for 52. With each instance refrigeration was required; meaning that under ordinary circumstances, compressors would be scattered at various hard-to-reach locations through the narrow basement.

Solution to the problem in the $110,000 combination institution was installation of a "compressor room" in the center basement *(see illustration on front cover this issue)*, where all refrigeration equipment is centrally located for easier service, lower cost maintenance and supervision. Instead of using a single compressor with multiple direct expansion valves (as was the case in a former location) James & Company, G.E. commercial refrigeration dealers of St. Louis, Mo. installed eleven compact refrigeration compressors in a single room 7x5 feet in size. Each unit is mounted on 2x4 shelving around the walls of the room, and has a specific cooling job to do without interfering with any other. A total of less than 9 tons of cooling applied in this way does the job more efficiently than a single 15-ton compressor in the old Katsina Cafe.

Thus compactly set up, the compressors refrigerate four dry-bottle beer boxes of stainless steel in the bar, and four reach-in coolers for wines and mixers in the back-bar, both kept at 38 degrees. Next is a combination steam table and salad bar, the latter using one one-ton unit connected to half-inch copper tubing which forms the base on which the stainless steel salad containers rest. Another one-ton unit is connected to a six-compartment porcelain reach-in box for steaks and fish dishes in the kitchen, and six stainless steel self-closing drawers for deep-frozen sea food opposite the porcelain box. Temperature here is 25 degrees.

Strikingly modern interior of the new Katsina Cafe, Springfield, Ill. In the long, narrow interior the bar is nearest the camera, next the restaurant section, and beyond that is the cocktail lounge.

Low temperature cooler room for freezing and storing sea foods at the Katsina Cafe, Springfield, Ill.

In the restaurant proper, one ton of refrigeration is applied to a five-hole Monel metal ice cream cabinet and four compartments kept at 26 degrees. A one-third ton unit cools the high-speed drinking water tap, and two small butter-chip refrigerated drawers. A novel feature also included is a semi-refrigerated dish cabinet in the kitchen which chills cold plates on which sea foods are served at low temperatures.

In the display window is a refrigerated Hussman-Ligonier case 4½x3 feet in size, which has a separate ¼ ton unit in a closet directly below. This is the only unit not in the "compressor room."

In the basement three one-ton coolers cool respectively a walk-in vegetable cooler room 7x5 feet, lined with Mikolite, at 40 degrees, a similarly designed meat cooler at 38 degrees, and a 5x4 deep-freeze room at 25 degrees for sea food stocks. These rooms are cooled with G.E. conditioned-air coil blowers. Opposite these insulated coolers, which are to the left of the compressor room, is a 12x6 foot beer-cooler room, in which 70 cases of bottled beer can be stored, with direct-draw beer lines tapped to metal kegs kept on stock directly below the bar. Another coil blower unit cools this room to 38 degrees with a ¾ ton compressor hookup also cooling the beer taps on the bar, and steel work surface under the bar top. A direct control

on the bar allows the head bartender to change temperature as required for additional cooling when large crowds mean need for more cold beer.

The single compressor at the display window was used as the only unit not in the room to save line loss, and operates independently. Otherwise all units are compactly placed together, in easily demountable brackets, where service time and repairs is considerably cut.

The restaurant specializes in steaks and sea foods, and with this type of refrigeration split up into individual units, has protected itself entirely against breakdowns.

"Special Services" Built St. Louis' Largest Refrigeration Service Firm

By Herbert Hanley

MAKING a success of refrigeration service requires specialization in all branches of the service, according to James A. Daniels, president of City Refrigeration Service Company, St. Louis, Missouri. Mr. Daniels is pretty well qualified to make that statement—for on December 20th he opened the largest commercial and domestic refrigeration service institution in the Missouri metropolis; a 12,800 square-foot building split into departments, each specializing in a separate phase of service.

City Refrigeration Service Company more than doubled its facilities by moving from a former location on Delmar Boulevard to the new building on McPherson Avenue in midtown St. Louis. Included are five separate departments, each built to its present size because the company has steadily added special services, trained its personnel to handle them, and "merchandised" all lines to the extent that its yearly gross business shows almost no peaks, and it has not been necessary to lay off a mechanic at any time for more than 2½ years.

"We don't believe in putting all our eggs in one basket," Mr. Daniels explained. "Nor spreading out facilities too thin to do a full-time job on any type of service we offer. We think that by properly setting up all phases of the business to the point that each can operate independently, we are bound to get as much business as we can handle."

In business only since 1936, the company has nevertheless expanded rapidly enough to employ 35 persons, become authorized service dealership for nine national manufacturers, and handle as many as 3000 calls in a single month. The new building is the third move made in five years, each time doubling space, and now will permit Mr. Daniels to offer complete facilities for all types of refrigeration and air conditioning service in the growing market developed by vastly decreased manufacture of new equipment.

City's volume has been built on its slogan of "We Do the Job Right the First Time," which appears on letterheads, invoices, company trucks, and in the huge telephone directory full page ad which Mr. Daniels has used for several years. He believes in advertising, averaging $125 per month for it, and in keeping in close contact with his customers or prospects. "My job is missionary work," he explained. "I spend all my time in simply selling service, running down potential customers, and seeing that those on the list are kept happy." City Refrigeration Service Company sells no equipment whatsoever, in this way not competing with any of its customers. Instead, services which Mr. Daniels sells are:

Domestic Service—About 50% of company business is made up of home refrigerator work. To maintain the huge volume of calls coming in, the company has 16 trained servicemen, several of whom can "double" on commercial work on air conditioning when needed. Twenty-four hour service is supplied bv keeping two night men on call during the summer, one in the winter season. All men maintain complete parts inventories in their automobiles, and are always within telephone reach of the dispatcher's desk in the main office. All are paid on an hourly basis which makes average earnings higher than union scale in St. Louis. Some men average $3500 per year, about tops in the Missouri industry. City uses direct mail, refrigerator stickers, novelty cards and the "do it right" slogan to keep all customers repeating. During August of this year there were 2900 calls checked in at the dispatcher's desk.

Refrigerator Reconditioning—Whereas many firms will not touch this work through fear of losing money on it, it has become a major activity at City—both for profit, and because the heavy amount of used refrigerators being overhauled makes ample work to keep the shop crew working through the winter. Mr. Daniels handles all reconditioning work on a flat rate basis with four major dealers of the city, giving a six months' guarantee on every job. During 1940 200 refrigerators were reconditioned; during 1941 the figure will surpass 350. A large paint shop for cabinet work (all paint is baked on) and complete machine shop for unit reconditioning enables City to use mass production methods. No City man is allowed to take dealer commissions, or sell any appliance. "Stay out of competition with dealers," Mr. Daniels warned, "and you can count on their business."

Ice Cream Cabinet Service—Another service which refrigeration service firms shy away from. City handles all upkeep installation and repair work for one of St. Louis' largest dairies, including more than 900 stops. This work is kept profitable by a staff of specially-trained service men who use "preventative service" and regular inspection to keep all cabinets in top condition. Every cabinet is listed on a huge inspection chart divided into "sectors" which mean that each will be inspected at least once every two weeks, and thus insured against costly breakdowns. City handles this work on a flat-rate basis, plus labor and cost on installation; has never lost money on any phase of it. Closely connected with this service branch is another handling frozen-food cabinets, also maintained on a flat rate basis with St. Louis frosted-food distributors.

Range Service—An innovation which has consistently paid its way. Two mechanics on the staff specialize in electric-range repair, and City is authorized for two national lines. The same domestic rate as for refrigerators applies to range repair—$1 for a call, 50 cents for each 15 minutes after arrival. With ranges steadily growing in importance, this service has been profitable from the start.

Commercial Refrigeration and Air Conditioning—Twelve men are on the commercial mechanic staff. Handling hotels, mortuaries, super markets, ice plants, dairies, drug stories and locker plant work, City makes no contract rates, regarding every service call as a separate job. There is a separate dispatcher for commercial service, guaranteeing immediate response, and twenty-four hour service with night men is also maintained. Expert mechanics are one asset which cannot be dispensed with in this work, Mr. Daniels emphasizes, therefore, his commercial men "graduate" to the commercial staff after years of domestic refrigeration repair. There are no seasonal "price specials" or rate considerations offered. City Refrigeration Service at all times depends on creating the proper impression on the first call, and repeat business will take care of itself.

Backing up all these services is a feature which has gained City a tremendous amount of good will—a "hot shot" truck kept always ready for use at the office, which is used exclusively to rush extra parts or needed tools to mechanics who run up against unexpected problems. The truck contains a complete inventory of parts for all commercial, domestic and air

conditioning repair work, has often been the means of getting a job done quickly enough to prevent costly losses in breakdowns where perishables are concerned.

Each of these services has its own men, although there are several mechanics on each staff who can switch from one service to another. Mr. Daniels has not lost a single man to the lure of high-pay defense jobs, never laid one off even for a day since 1938, and has a smoothly-operating staff as a result, made up of men trained the way he wants them. Thus, specialized service, and specialized facilities for each, have created a remarkable organization for this St. Louis service firm.

New Hotel Refrigeration System Cuts Expense

By Donald Delayen

THE cost of obsolete refrigeration equipment is often so high that new equipment can be purchased with the saving made over a short period. This is a fact well known to most institutions. At the Hotel Nicollet, Minneapolis, Minn., this fact has been well illustrated by installation of a new refrigeration system and ice making machine which will pay for itself entirely within the short space of two years.

At the close of 1940 the Hotel Nicollet installed seven separate refrigeration systems, taking care of storage rooms, deep-freeze cooler, cooler rooms, and liquid storage refrigeration as well as ice manufacture. These replace an old CO_2 system made up of a horizontal compressor operated by a 75 horsepower motor. The 75-ton system provided circulated refrigeration for approximately 18 cooling zones, but at a cost which the Nicollet found more and more oppressive year after year. Circulating brine, the former system had only the job of producing four tons of ice, from an ice making tank located in the basement ten feet from the refrigeration plant, and the cooling of various foods and liquid storage departments in the kitchen and basement of the building. The ice making tank was built especially high to contain a surplus of brine for unusually heavy loads throughout the building. Other than that, there was no flexibility in the system, and it was steadily proving itself inadequate to meet the demands of the hotel restaurants, coffee shop and cocktail lounge. No difficulty was experienced in producing correct temperature for sea foods, vegetables, meats, ice, etc., but the cost was exessively high. Particularly responsible for high cost was defrosting of the brine coils in each refrigerator, which took as much as six hours at a time, and in each instance, hampered the operation of other units not undergoing the defrosting process. Consequently, the management of the hotel was prone to let the system continue operation without defrosting, adding as much as thirty-three and one-third per cent to the cost per day of circulating the refrigerated brine. Another deterient factor was inefficiency of the insulation on circulation pipes, which had to be constantly re-covered with whatever materials the hotel found available.

In late autumn of 1940, the Nicollet determined to replace the entire system insulation, but because of the war, discovered that new cork insulation would cost more than $4,000. Rather than spend this extra sum to keep a system already too high in cost in operation, it was voted to discard the old CO_2 system altogether, replacing it with direct-circulation refrigerant using smaller compressors which would operate individually. Thus, the new refrigeration system consists of independent units, each with a specific job

Low temperature storage room at the Hotel Nicollett

to do, defrosting themselves automatically, and maintaining the temperature controlled by individual thermostatic expansion valves.

All seven of the separate compressors used in the new system now operate entirely automatically, those above 30 degrees automatically defrosting themselves at a set period from 24 to 48 hours apart. In each "zone" of refrigeration, a single compressor powers coils or unit blower systems in one, two, three, and even four coolers. None of the compressors used amount to more than five horsepower, and the total is only 38 horsepower—a reduction in power of nearly half. Despite the fact that power has been thus lessened, the hotel is now directly cooling its water supply, and manufacturing two tons more ice per day than was possible with the old system. Rather than re-use the old brine-coils in storage boxes, walk-in coolers, and other refrigerated rooms in the building, the management of the Nicollet has provided each with a cooling system of separate types. Rooms used for vegetable, meat cooling and prepared food storage are now cooled by slower-type gun coolers. Where lower temperatures are required for such foods as sea foods, dairy products, etc., overhead coils are used, with expansion valves producing automatic control. In this way, compressor operation is cut considerably, the longest run for any single unit not more than twelve hours a day—the shortest two hours a day. Consequently, a saving in electrical consumption was an immediate result.

The former ice-manufacturing tank produced four tons of ice per day, placing a heavy load on the brine refrigeration system. With the new arrangement, six tons can be produced over a 24 hour period, operating entirely automatically, and requiring no power whatsoever on low-demand days. A thermostat connected to an expansion valve in the brine flow rules on the amount of power needed, and when less than half of the total ice content is removed, the system will remain dormant for hours at a time.

By thus breaking down the refrigeration requirements of the hotel into individualized units, a saving for each four week period of the year of 20,000 kilowatt hours per period has been effected. At a cost of 1½ cent per kilowatt the saving of power totals slightly less than $4,000 per year, or possibly even more. Another considerable economy is effected in ice, as well, the hotel now manufacturing all the ice it requires, whereas formerly $250 worth of ice per four week period had to be purchased from an outside source. This $3,000 saving, added to the above economy, totals to $7,000 per year, thus in two years paying the total new-system installation cost of $14,000.

Converted Auto Engines Cut Cooling Costs

MOTION picture exhibitors, first to capitalize upon summer air conditioning when it became commercially practical not many years ago, are again pioneering with regard to the most economical means of powering compression air conditioning apparatus. Theater maintenance costs are figured closely, often so closely that eco-

nomical or wasteful plant operation budgets can make the difference between profit and loss. That's why it is significant that the owners of the new Beverly Theater, Detroit, have found it possible to use adapted automobile engines run on regular city natural gas to power the two 60-ton Baker compressors which do the air conditioning in their 1487-seat theater—and operate them at a seasonal cost which they have found from experience to be "less than half of the cost they would have to sustain if they used any other available type of motive power, or any other available type of air conditioning plant."

The set-up was worked out by the Michigan Consolidated Gas Company in cooperation with the Simplex Engineering Company, Detroit, who made the installation. It consists of two Ford V8 engines equipped with high-altitude or high-compression heads (7½ to 1 ratio) and Ensign natural gas carburetors. The engines are fitted with governors which limit the top speed to 2200 r.p.m., and are connected by V-belts to the two compressors. Although the engines are listed as 85 horsepower models, they actually, in this case, deliver but 54 horsepower at top speed, adapted as they are to continuous operation on natural gas. Modulators are provided so that either engine may be slowed down as gradually as required to 1100 r.p.m. Thus, there being two engines and two compressors, any degree of adjustment from ¼ capacity to full capacity operation is obtainable. Were alternating current motors used for the power it would be necessary to operate them at a substantially constant speed.

The actual record of the engines' operation during their first full season (June 15 to Labor Day, 1938) is "proof of the pudding." Between the two dates the air conditioning unit was in continual operation from 12:00 noon to 12:30 A.M., Sundays and holidays included; and, on occasional hot days during the few weeks both preceding and succeeding this period, was used "as required." The coils connected to the compressors were chilled to 80 degrees F., and a resultant dry bulb temperature of 74 degrees F., was maintained in the theater auditorium itself. Over the entire season the cost of operating the gas engines was $331.82, broken down as follows:

Cost of gas fuel (five monthly bills)	$132.24
Cost of water for cooler	176.08
Oil	3.90
Cleaning filters	19.60

Were other means used to power the Beverly Theater compressors, the owners say, "After talking to other theater owners in Detroit, and consulting with the utilities involved, we are convinced that our season bill for energy alone would have been about $600, some $450 more than we now enjoy."

"Maintenance and care of the engines," they continue, "has been insignificant. No attention other than starting and stopping the motors, changing oil once during the season, and having oil filters cleaned, has been required at all."

In view of the fact that the fear of breakdown and excessive servicing commonly (and generally without cause) perplexes those contemplating the use of converted automobile engines, a few practices at the Beverly Theater to obviate such trouble will be of interest. Batteries are traded in for new ones each year, substantial allowances upon the old ones being obtained. Thus, at a very slight premium, ignition worries are completely nullified. A non-paraffin-base oil is used. This is important because in continuous operation on natural gas the crankcase temperature is 30-40 degrees F. higher than that which would be attained in regular automotive service for the same engine.

Finally, it is interesting to note that tap water is not used for the engine cooling. This function is performed by 500 gallons per hour of the 100 degree F. water delivered at a pace of 3200 gallons per hour by the cooling tower associated with the rest of the system. Here is another "dodge" for the ultimate in economy.

So successful has been the Beverly set-up that, since its installation, four other theaters in the Detroit area have gone to like means of powering compression air conditioning plants—by internal combustion engines fueled with regular city natural gas.

Service Notes on
The Grunow Refrigerator

CONTINUED FROM THE DECEMBER ISSUE

By PHIL GREGOR

Service Procedure

ALWAYS try to find out from the customer how the box has been operating, although you will find in the case of a Grunow this particular information won't help as much as it does on other types of units. Then proceed to check the condenser. Be sure that it is absolutely clean, and that the fan is in perfect operating condition. Running fans are sometimes not operating right. The fan must turn over at a sufficient rate of speed to create a breeze through the condenser that can be felt at least 6 inches away from the compressor dome when the back is removed.

In the meantime you have installed a purge tool which will give you the pressure under which the unit is operating. Then referring to table 2, you can pretty well tell if the condenser is clogged. The head pressure will be extremely high, but after cleaning, the pressure will begin dropping and the refrigerator will go into its normal cycle unless there is air in the system, or some other defect is causing the imperfect operation. In the case of air, the unit must be tested for leaks.

Leaks

To test for leaks, it is necessary to have a special leak test gauge and valve fitting and a good automobile tire pump. Open the inner purge valve with a screw driver and attach the purging tool, gauge, and tire pump. Pump into the system about 60 lbs. of air. If the system has a highside float, this float must be lifted with a magnet before air is pumped into the system. After the 60 lbs. of air is in the system, remove the magnet and proceed to look for leaks. Most frequent leaks are found: (1) Tubing connections on unit. (2) Float valve and all connections. (3) Dehydrator. (4) Condenser. (5) Radiator. (6) Compressor. (7) Dome gasket. (8) Inlet and outlet lines. (9) Compressor base. (10) Evaporator. All seams and joints, suction line connections and liquid line connections. Be absolutely sure that there is not even the smallest trace of a leak. If there are no leaks, the air may be allowed to escape from the system and the purging procedure started.

Purging

The purging procedures advised by the manufacturer in my estimation has always been best. It is very simple and produces the best results. First, the unit should be allowed to run for a period of time. The compressor dome should be quite warm. Attach the purge tool and open both the inner and the outer valves. This will allow the air and some carrene vapor to escape. Insert an ice pick or a length of wire into

TABLE 2—HEAD PRESSURE CHART

Room Temp.	Sea Level	1000′	2000′	3000′	4000′	5000′	6000′	7000′
60°	13.4″	12.3″	11.2″	10.0″	9.1″	8.1″	7.2″	6.2″
65°	11.5″	10.4″	9.3″	8.1″	7.2″	6.2″	5.3″	4.3″
70°	8.4″	7.3″	6.2″	5.0″	4.1″	3.1″	2.2″	1.2″
75°	7.3″	6.2″	5.1″	3.9″	3.0″	2.0″	1.1″	.1″
80°	5.0″	3.9″	2.8″	1.6″	.7″	.1#	.6#	1.1#
85°	2.4″	1.3″	.2″	.5#	.9	1.4#	1.9#	2.4#
90°	.2#	1.0#	1.3#	1.9#	2.4	2.8#	3.3#	3.8#
95°	1.6#	2.2#	2.7#	3.3#	3.8	4.2#	4.7#	5.2#
100°	3.1#	3.7#	4.2#	4.8#	5.3	5.7#	6.2#	6.7#
105°	4.7#	5.3#	5.8#	6.4#	6.9	7.3#	7.8#	8.3#
110°	6.6#	7.2#	7.7#	8.3#	8.6	9.2#	9.7#	10.2#
115°	8.4#	9.0#	9.5#	10.1#	10.6	11.0#	11.5#	12.0#

the condenser so that it will hold the fan from turning. Start the compressor again and immediately stop it. Repeat this operation until no more air comes out of the purge valves, then close the outer purge valve and permit the machine to run continuously. When the purge gauge reads from 3 to 5 pounds, purge from 5 to 10 seconds and close the outer purge valve again. Make two more purges of this kind in intervals of five minutes. Then close both inner and outer purge valves tightly, remove the wire holding the fan, turn the thermostat to a high position and at the end of fifteen minutes running, the inner purge valve should be opened long enough to allow the gauge to settle to a steady reading and then closed again. Wait fifteen minutes and repeat the operation, and if the vacuum is improving, it is a preliminary indication that the machine is purged and not leaking. Sometimes it will be necessary to repeat the actual purging operation in a day or two after the preliminary one.

Checking the Carrene Charge

Be sure that several inches of vacuum exists at the head side of the machine. The compressor must be hot when checking the charge. Open the suction line by loosening the flare nut at the compressor base. Allow about ten minutes for the air pressure which has entered the evaporator to force the liquid from the evaporator to the float chamber or carrene meter. Remove the purge valve and insert a 3/16 inch copper tube which has had a funnel soldered to its end. Be careful not to put tubing into the float valve too far as there is danger of damaging the inlet screen. Then pour in the carrene until the chamber overflows, tighten the flare nut in the compressor base, and start and stop the machine several times until air no longer escapes from the purge valve. Then proceed to purge in the manner already outlined.

Head Pressures

Table 2 shows the approximate head pressure when the gauge is attached to the port of the float, or carrene meter and receiver assembly, at the end of the on cycle. This chart is very important as a check to be sure that the unit has been thoroughly purged. To use this chart, simply find the room temperature, then follow the line over from that temperature, to the column below your approximate altitude such as: In Tucson the average summer day temperature inside is 85° the elevation is 2500 feet, therefore the approximate head pressure at the end of the on cycle should be between 2 inches and 5 lbs. It should be understood that these figures are only close approximates.

Thermostat Settings

In reference to the manufacturers' recommendation on thermostat settings, it will be noted that altitude effects the setting of the thermostat control. The thermostat controls are set at the factory so that at position No. 2 it will give a cabinet temperature of approximately 42° when the room temperature is 80°. The greater the altitude the lower the refrigerator temperature. A change of one inch in barometer reading will shift the thermostat bulb temperature about 1¼ degrees at the on and off position. To correct the thermostat for barometer variations, the metal cap on the end of the control knob should be removed and the screw underneath loosened. Shifting the knob clockwise raises the box temperature. It may be necessary at some time to reset the thermostat control for other reasons. For example: The machine may operate with a defrosting cycle in an 80° room. With the thermostat set on the No. 2 position, this might be caused by a poor contact between the bulb and the evaporator. The shorter the cycle the higher the box temperature will be. It is obvious then that to cure a defrosting cycle with a thermostat set in position No. 2, it is necessary to produce a more intimate contact between the bulb and the evaporator and at the same time reset the cold control knob in a counter-clockwise direction with respect to its former setting.

Servicing the Compressor and Motor Assembly

Always be sure to check all electric cords and connections before opening or disposing of a compressor that fails to start. The compressor assembly contains over one quart of oil, therefore when removing the dome, tip the assembly over the edge of a bench with the exhaust port down. Open the suction port and attach a pump with suitable fittings, and pump air into the unit until most of the oil is forced out of the exhaust port. When replacing the dome always use a new dome gasket. The air gap between the motor rotor and the stator

should be .010 inch. When reassembled the motor rotor is attached to the compressor shaft by a tapered bushing and held in place by a screw through the rotor fan.

The Check Valve

The check valve seat may be removed from the frame by the use of a special puller. Inspection of the seat and wafer may be made by pulling the check valve stop. In pulling the stop it is necessary to tap the hole which is provided for this purpose with a 3/8x24 tap and inserting one of the dome bolts and then using a puller. This plug should be replaced with a new service plug and should be forced in. When replacing the oil, enough should be added to bring the level up to 1 5/8 inches of the top of the compressor base.

Testing for Faulty Electric Apparatus

Pull the line cord and disconnect the red lead from the capacitor to the transformer. Connect the condenser in series with a 25-watt lamp. The lamp will burn bright if the capacitor is shorted, dimly if it is O.K. and not at all if it is open. Check for ground from terminals to the can by means of simple continuity test. Voltage from the green to white lead of the transformer should be 300 to 318 volts. Voltage from the white lead to the red lead should be 182 to 225 volts. Shorted turns in the transformer will show up by poor starting or excessive heat in the transformer. Be sure that the relay plunger is free. When closing the thermostat switch the relay plunger should rise to the starting position. If it does not the main winding circuit is open. Check the starting contacts by shorting them to see if the motor will start. If the motor starts, the contacts should be cleaned so as to make proper contact. If the relay plunger does not return to the running position when the motor is up to speed, the motor stator is probably defective. The relay plunger should rise at about 10.5 amps. and fall at about 9 amp.

Condenser Radiator

About the only servicing needed in the condenser radiator will be the cleaning, and at times an obstruction will occur at the point where the small tubing connects from the float chamber with the bottom of the condenser.

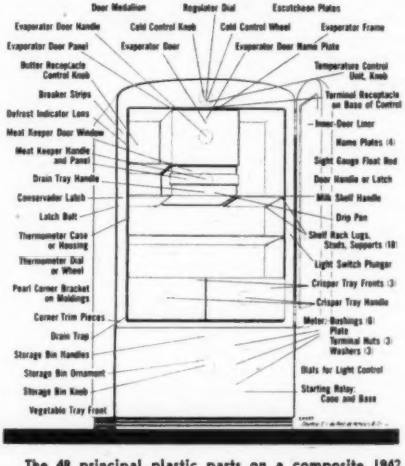
A stuck float valve can be replaced with a carrene meter and receiver assembly. To replace an evaporator remove the flare nut which connects the liquid line with the evaporator. Be very careful not to damage the tubing at this point. Pull the plug fitting apart at the thermostat, loosen the 4 nuts which hold the two top mounting brackets in place, and the evaporator will come out. If the machine was under a vacuum the evaporator will contain carrene. If the head side of the machine was not under a vacuum, carrene will run out of the liquid header when the liquid line is taken off. Remember that a more perfect flare connection is made if a drop of oil is placed on the tube side of the flare nut, but not on its face. During repair operations on the Grunow unit it is a good policy to remove the buffer springs from behind the rotor vanes, and always check the suction screen. Also where the stator is known to be in good condition, be very careful in removing the dome, as you can very easily damage the insulation on the stator.

Never be in a hurry while servicing Grunow units, as it is very easy to overlook some small item that is causing the difficulty.

(Concluded)

S S S

PLASTICS ON AN ELECTRIC REFRIGERATOR



The 48 principal plastic parts on a composite 1942 electric refrigerator are shown on this chart. An estimated 20 per cent increase over 1941 in the number of plastic parts is attributed not only to metal scarcities but to plastics' insulating value, economy, durability, and rust and moisture resistance, which adapt them particularly to electric refrigerators.

Model 91A
Philco Air Conditioner

By WALTER G. WARNER

THE Philco-York Model 91A is a compact ¾-ton air conditioner, designed not merely as a room cooler but rather as a year 'round air conditioning machine. Its cabinet houses a well built mechanism that performs the following functions:

1. Cools the air—9100 b.t.u. per hour cooling capacity.
2. Dries the air—removes over 2 pints of water from the air per hour.
3. Ventilates—brings in as much or as little fresh air as you want. Adjustable 0-330 c.f.m.
4. Exhausts—removes stale air and odors —adjustable from 0 to 300 cubic feet per minute.
5. Cleans the air—both fresh and recirculating air pass over a specially designed filter which removes dust and dirt. When cooling is on, the air is further scrubbed clean as it passes through the wet fins of the cooling coil.
6. Circulates — two quiet squirrel cage fans keep all the air in the room in constant draftless motion. By a flick of a switch this circulation can be speeded up or cut down to satisfy the comfort requirements of the user. Even the direction of the conditioned air is under the user's finger tip control.
7. Shuts out noise—Fresh air is obtained without open windows. Special sound deadening material inside the fresh air ducts cuts out the street noises that normally enter the room through open windows. Careful design keeps the noise at a very low level.

Construction

The Philco-York Model 91A is built in two sections. The lower section houses the refrigerating mechanism which consists of compressor, compressor motor, compressor fan, condenser and receiver, whereas, the upper section houses the cooling unit, and includes the cooling coil and expansion valve, two squirrel cage blowers, blower motor, and air filter.

The Refrigerating Machine

The compressor and compressor motor are mounted on a four point spring suspension so that no vibration is transmitted to the unit chassis.

The compressor motor is double shafted. The short shaft carries the double sheave motor pulley which drives the compressor whereas the long shaft carries the condenser air fan. As will be explained later, this fan circulates air from out-of-doors through the refrigerating machine compartment and through the condenser to remove the machinery heat.

The eight-row condenser coil is surrounded by a metal shroud, the lower part of which forms the condenser fan scroll. The metal shroud is connected to the chassis by means of a canvas connection. This connection further lessens the possibility of vibration between the mechanism and the chassis.

The compressor is of the latest York design. It has three cylinders and operates at high speed. The compressor itself is very quiet in operation and the usual valve tick has been reduced to a very low level. The compressor is equipped with the standard two-way head and suction valves for easy servicing.

With the exception of the condenser and suction lines connecting at the compressor, all line joints are soldered or brazed. Thus, should it ever be necessary to change an expansion valve, liquid receiver, or any other part it will be necessary to cut the connecting lines and install the new part either with flare unions or sweat connections. Because the receiver is not equipped with a shut-off valve, it will be necessary to discharge the system before any parts can be changed.

The compressor motor is ¾ hp. of the capacitor-start induction run type on A.C. and compound wound type on D.C. On A.C. machines, a built-in thermostat protects the motor from burning out should it become overloaded for any reason. The D.C. machines are protected by a time delay fuse. The entire refrigerating machine compart-

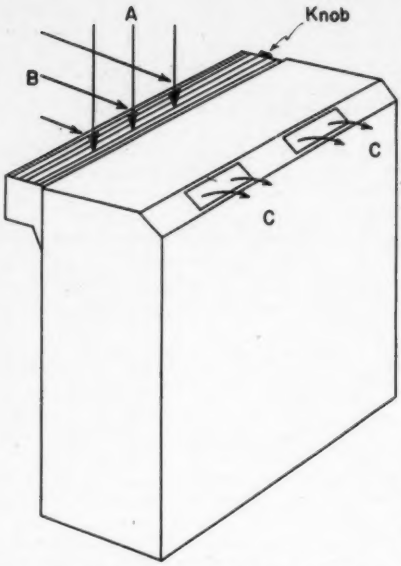


Fig. 1—When the damper knob is down the room air is recirculated through grill in the direction indicated at A. When the knob is up, fresh air is taken in at B.

ment is enclosed with a sound deadening material.

The Upper Section

The upper section houses the low side of the system, which includes: two squirrel cage blowers, double shafted fan motors, expansion valve, and air filter.

The 1/40 hp. double shafted fan motor is of the capacitor-start, capacitor-run type on A.C. and shunt wound on D.C. A switch on the control panel labeled "slow-fast" controls the speed of the fan motor. When the switch is in the "fast" position the fan motor operates at 1140 r.p.m. When the switch is in the "slow" position a resistance is cut into one of the motor windings and the motor then operates at a reduced speed.

The two squirrel cage blowers are surrounded by conventional scrolls that pull air through the filter and cooling coil and then direct the air upward through two holes in the fan baffle plate and through the discharge grille. See Fig. 1.

The discharge grille is fitted with a louvre operating key which allows the air to be thrown vertically upward or almost horizontally into the room. Above and to the rear of the fan assembly is the six-row cooling coil. The coil occupies a position in the central part of the conditioner as shown in Fig. 1. It is of the conventional fin and tube design, except that both fins and tubes are made of steel. All coil connections are brazed and no flare fittings are used.

Immediately behind the cooling coil is located the Walton shredded paper, viscous coated filter. As will be explained later, this filter cleans both fresh and recirculated air before these air streams get to the cooling coil.

Operation of Unit

The window duct connection is split up into three individual compartments as shown in Figs. 2 and 3. Outdoor air is drawn into the unit through section (1) of the window duct by the condenser air fan (4), over the compressor (5), and the compressor motor (6), into the condenser fan scroll. From here the air is discharged upward through the condenser (8), and out of the unit through duct section (3). This air in passing over the hot compressor, motor and condenser, picks up heat from these parts and carries the heat out the window.

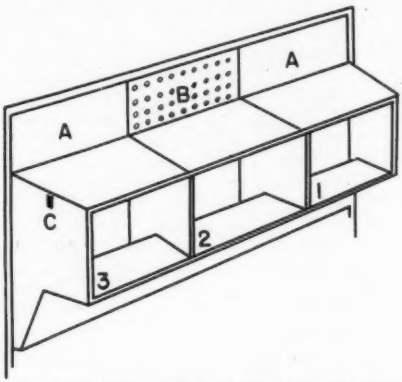


Fig. 2—The three partition window duct. (1) is for room air exhaust. (2) is fresh air intake and (3) is exhaust from condenser. A are filler boards. B, the filter and C is the fresh air damper knob.

On the top of section (1) of the window duct connection, there is an opening as shown in Fig. 2. Inside section (1) there is a damper which is hinged at the top of the duct. When this damper is revolved downward it partially closes off section (1) from the outside air and at the same time opens the grill in the top of section (1) to the room. Now, when the refrigerating machine operates, the condenser air fan cannot get

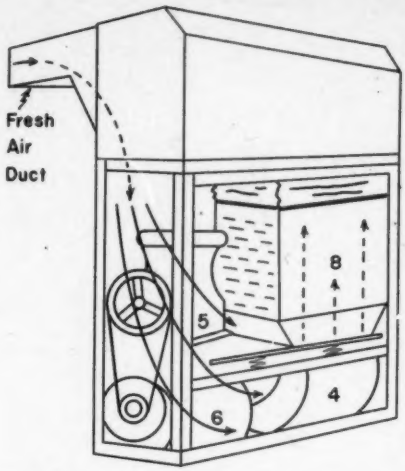


Fig. 3—Fan (4) pulls fresh air through section (1), Fig. 2, of fresh air duct, over the compressor (5), compressor motor (6) into the fan (4). The fan sends this air upward through the condenser (8) and out through section (3) Fig. 2.

air from the outside because the damper has closed off section (1) of the duct. Hence, the condenser air fan now pulls air from the room through the grill on the top of section (1), passes it through the condenser and out of the unit through section (3) of the window duct. Thus, air is taken from the room and is exhausted to the outside. This exhaust feature can only operate when the refrigerating machine is operating, since the fan which creates the exhaust is driven by the compressor motor.

When the master switch is set in either the "air" or "cooling" positions, the fan motor starts and the two squirrel-cage blowers draw air through the filter then through the cooling coil into the fan scrolls, where the air is then discharged upward through the adjustable grill into the room. As the air passes through the filter, dust and dirt is removed. When the master switch is in the "cooling" position, heat and humidity are removed from the air as it passes over the cold cooling coil. See Fig. 1.

The customer can select at will the proportion of fresh air to recirculated air by merely operating damper (2). This damper is located in section (2) of the window duct. When the knob is in the "recirculated air" position, damper (2) is in a vertical position so that it closes off section (2) of the window duct and at the same time opens up the grill opening in the top of section (2) of the window duct. Now, when the blowers operate, they draw air from the room, through the grill opening, through the filter, through the cooling coil into the room.

When the knob is in the "fresh air" position, damper (2) is in a horizontal position closing off the grilled opening in section (2), and opening up section (2) to the outside air. Now when the blowers operate, they pull all fresh air through the filter, through the cooling coil and discharge air into the room. By setting the position of the damper, any proportion of fresh to recirculated air can be obtained. Of course, when a maximum cooling effect is desired, very little hot outside air should be drawn into the unit. However, on many days in Spring and Fall when the outside conditions are not severe, it will be possible to maintain very comfortable conditions in the room just by running the blowers and drawing into the room 100% outside air.

(To be continued in the February issue)

SERVICE DE LUXE ON A BICYCLE

(Continued from page 22)

(8) Transportation of waste and scrap materials;

(9) Transportation of raw materials, semi-manufactured goods, and finished products, including farm products for foods, provided that no certificate shall be issued for a new tire, casing, or tube to be mounted on a truck used (a) for the transportation of commodities to the ultimate consumer for personal, family or household use; or (b) for transportation of materials for construction and maintenance except to the extent specifically provided by sub-sections (2), (3), (4), (5), and (6) of this section (e).

(f) On farm tractors or other farm implements, other than automobiles or trucks, for the operation of which rubber tires, casings or tubes are essential.

(g) On industrial, mining, and construction equipment, other than automobiles or trucks, for the operation of which rubber tires, casings, or tubes are essential.

It will be noted that under Section (a) which refers to vehicles used in services permitted to secure tires, no mention is made of the servicing of electrical or other equipment. Under Section (e), Subsection (6), referring to trucks, specific mention is made of "Transportation essential to render—heating and electrical repair service."

The only interpretation we can place on this order as it now stands is that unless you use a truck in your service work you are out

FEDDERS MANUFACTURING CO.
INCORPORATED
•
BUFFALO, NEW YORK

TO ALL REFRIGERATION

SERVICE ENGINEERS:--

Official WASHINGTON recognizes the vital job you Service Engineers are to do individually and collectively in protecting and preserving America's billion dollar supply of perishable foods, medicines, Blood Banks, etc.

Official WASHINGTON knows that you and only you Service Engineers can keep the millions of refrigeration systems running for the duration of the war.

Official WASHINGTON realizes that each Service En- top pri[illegible] safeguarding America's health and America's

Official WASHINGTON is proving by action now that

Official WASHINGTON realizes that each Service [illegible] top priority safeguarding America's health and America's

Official WASHINGTON is proving by action now that there will be no blackout on SERVICE.

We of Fedders realize that official WASHINGTON insists on the Highest Quality and the Utmost Efficiency. We of Fedders are happy to report that our Electric Refrigeration Units are equal to these demands, and are ready to give you full cooperation with prompt deliveries, with nation-wide distribution.

Very truly yours,

W. D. KEEFE

Sales Manager.

of luck for tires. The fact that our industry has now or may secure a high preferential rating does not make any difference to your ability to secure tires. Furthermore, there appears to be no relief in sight for the serviceman on this particular order.

If you are able to secure a truck or are already using a truck for service, you should have no trouble but if you are using any other type of motor driven vehicle you are out of luck.

Our industry is not the only one affected. Others whom we consider very essential cannot get tires, even for trucks. One of these, as an example, are the dairies. Trucks or vehicles of any kind used in the home delivery of milk cannot secure new tires.

It is time now to start conserving. Long distance traveling to a service call will have to be a thing of the past unless you travel by bus or train. Your membership in the Refrigeration Service Engineers Society will become useful again in exchanging customers with your fellow members and endeavoring to confine your service to your immediate community. In the larger cities many calls can be made by streetcar.

A supplemenetary order issued at a later date states that bicycle tires will not be rationed. Maybe this will give you an idea.

Conserve Power
OPACS Tells Refrigerator Users

Refrigerators Placed Next to Electric Lights as Biggest Power Users in Homes

IN a bulletin recently issued by the Office of Emergency Management, Division of Office Of Price Administration and Civilian Supply, Washington, D. C., entitled "Your Refrigerator and National Defense," an appeal is made to the householder to aid the defense program by the more efficient use of of the domestic refrigerator.

Simple suggestions are made as to the proper care of the refrigerator in conserving its usefulness and securing efficient and economical service.

The material is well presented and contains such information that the serviceman often finds the customer is desirous of securing. Much of the information has been included in the customer's manual but may have become misplaced or many of the users may have used refrigerators.

THE REFRIGERATION SERVICE ENGINEER will provide this reprint in convenient form so that our readers may distribute it to their domestic customers if a sufficient number indicate their interest in securing these reprints. The cost, depending upon the quantity, will be small.

YOUR REFRIGERATOR AND NATIONAL DEFENSE

Next to electric lights, refrigerators are the biggest power users in consumers' hands.

It isn't that your electric refrigerator uses so much power. As a matter of fact, a refrigerator uses a comparatively small amount of power in the work it does. But like electric lights, refrigerators are in use every day and lots of people own them. The Department of Commerce estimates that there are probably about 18,000,000 refrigerators running today.

Taken together, these refrigerators are using a great deal of electricity, about 6 billion, 300 million kilowatt hours a year, according to a rough estimate, or about 20 per cent of the power now used by consumers. And electric energy has become a strategic defense material.

It is possible for consumers to help build National Defense by using their refrigerators efficiently, by cutting down their use of power without depriving their families of adequate refrigeration.

RULES TO BE FOLLOWED

The rules for conserving refrigerating power are simple and easy to follow but there are a number of them. If consumers will follow all of these rules they will cut down their electric bills. And in those areas where power shortages threaten they will not only save their own purchasing power but will help to produce aluminum and other strategic materials.

Many of these rules consumers probably already know. Their own common sense has dictated them. Others can be found in the manufacturers' manuals on the care and operation of the refrigerator which are given to every purchaser when he buys his box. But CONSUMER PRICES has brought them all together here with an explanation of the "why" behind them, so that the list can help you save the nation's supply of power and your own pocketbook.

Faith

OUR FAITH lies in the indomitable nature of Man . . . typified by you and thousands of others in all walks of life who have solved, step by step, the most baffling problems in the world.

WHEN YOU REALIZE that in hardly more than a century Man has harnessed steam, combustible fuels and electricity to do his will . . . that he flies nearly eight miles in the air, travels fathoms under the sea, flings his voice around the world in an instant, predicts to the second, minute and day when an eclipse will occur 20,000 years hence, weighs the very earth on which he stands, turns night into day with a hair-fine filament and freezes by heating . . . then surely your problems of today are within the realm of mastery.

WITH US, AS WITH YOU, it is shortage of manpower and materials that makes the going tough . . . but we are finding answers to problems that at first appeared insurmountable.

SUBSTITUTES may replace some familiar materials out of necessity . . . design changes may result . . . but Progress has not stopped at Kerotest.

KEROTEST VALVES AND FITTINGS, being produced as rapidly as possible, are the result of progressive designing and the well-chosen use of available materials that still maintain the same accuracy, dependability and serviceability you have always known as the hallmark of Kerotest products.

OUR FAITH has proved well-placed in Man . . . who unfailingly accomplishes the seemingly impossible. Our faith is rewarded by the continued, even though somewhat limited, production of top quality Kerotest Valves and Fittings in the face of most adverse supply conditions.

SHARE WITH US a similar faith in dealing with your own problems and look to Kerotest, as always, for the dependability and acknowledged economy of genuine Kerotest Valves and Fittings.

KEROTEST MANUFACTURING COMPANY

PITTSBURGH · PENNSYLVANIA

J. C. Strachan

General Sales Manager

KEROTEST

MANUFACTURERS OF TOP QUALITY VALVES AND FITTINGS FOR THE REFRIGERATION AND AIR CONDITIONING INDUSTRY

1. Don't open your refrigerator any oftener or any longer than is actually necessary.

When the door of the cabinet is open, obviously, as the cold air spills out, the warm air of the kitchen rushes in and electric power must be used to re-cool the box. It is a good practice to take out of the box all things needed for the preparation and serving of the meal at the same time. And after the meal, assemble all that must go back into the box before opening the door.

2. Don't put hot food or dishes in the refrigerator.

Let the left-over foods and the dishes they are in cool down to room temperature before putting them in the box.

3. Avoid quick freezing.

When you turn your temperature control to cold, or very cold, you are using much more power than when it is set on economy or at a point to give you normal freezing. Since quick freezing is needed only for frozen desserts and speedy ice making, you can best avoid quick freezing by conserving your ice and preparing other kinds of desserts.

When you take ice out of the tray be sure to refill the tray immediately so that you have a supply always on hand. And if you are going to use only part of the cubes from the tray, put the remainder in a bowl and put them back in the box to keep where they will be preserved longer and help keep the box cool. Another good practice is to keep a bottle of water in the box and use it, rather than iced water, for drinking in hot weather.

4. Turn your control down to "economy," that is, to the lowest operating point, if you leave for a weekend.

Of course, if you can turn the refrigerator off entirely you will save even more power and if you are leaving for any length of time, that is a good thing to do.

There are a few refrigerators, however, which cannot just be turned off and let go for the whole of a vacation time. If, for example, your refrigerator is the kind with a belt driven machine, it might develop a gas leak if it is left off. For this kind of refrigerator the best thing to do is to leave the box on at economy or call a service man and have it drained before turning it off. (The gas that he will drain is not the gas you buy from a gas company, but a gas used by your refrigerator in its cooling process.)

For an absence of only a day or so, you will probably need refrigeration for such supplies as milk, cream, butter, eggs, etc. At "economy" the box will stay cold enough when you are away because it won't be opened and flooded with warm air.

Be sure to leave the door of your refrigerator open after it is turned off. If you don't, it is likely to develop a very bad smell inside the box.

5. Defrost your refrigerator whenever the crust of frosty ice around the freezing unit at the top of the box gets one-quarter of an inch thick.

The unit that holds your ice trays contains the cooling coils and these are very important elements in keeping your refrigerator cold. When a heavy crust of ice covers them they cannot operate efficiently. Thus, even though that crust is ice, it acts as a barrier in the work of your refrigerating machine and actually makes it work harder to keep the box cold. Every time the machine works, it uses electric power.

6. See that your refrigerator is properly placed in your kitchen.

Your refrigerator should be in the coolest part of the room away from your radiator, steam pipes, oven, or hot south or west sun. But even more important than that, it must be so placed that air circulates freely about it. It must not be flat against a wall, unless it has a guard at the back that allows free air circulation.

The refrigerator works by removing heat from the box. Unless that heat, and the heat generated by the electric machine at the bottom of the box, can escape freely into the room, the refrigerator stands constantly in a blanket of warm air. (In some models this unit may be at the top of the box, but wherever it is it generates heat.)

The cost of moving your refrigerator if it is improperly placed in your kitchen depends, of course, on the space you have available. Perhaps all you will need will be an extension cord or new electric socket. In that case, the change would pay for itself many times over. Be sure that you consider conveniences as well as economy in such a move.

7. Keep your refrigerator clean—all of it.

Most people do regularly wash the inside of their boxes but many forget to keep the coils in the ice unit clean, and still more forget to clean out the coils connected with the electric machine described above. These latter coils must be cleaned of dust or dirt at least two or three times a year. If they are allowed to gather a covering of dirt, this covering keeps them hot. Your refrigerating machine then works harder, and makes the air round the box hot, and so on.

When you clean the inside of your box—and the time of defrosting is a good time to do that—be sure to wipe off the coils inside the ice-tray units as well as the sides of the box.

To clean the inside of your box, wash it with water in which you have dissolved washing soda. About a tablespoon of soda to a dishpan of water is enough.

To clean the coils outside the cold box use a stiff brush or the suction hose on your vacuum cleaner.

8. IF YOUR REFRIGERATOR MACHINE RUNS NOTICEABLY MORE THAN IT DID WHEN IT WAS NEW, HAVE A SERVICE MAN CHECK UP ON IT.

This presupposes, of course, that it is running more than it should *after* you have defrosted and properly cleaned it.

It may need minor repairs, or it may be that the insulating material in the box has deteriorated. In some of the refrigerators manufactered before 1936, the insulation material was not sealed to keep out moisture during the hot weather months. In northern sections of the country, the insulation has a chance to dry out during the months of cooler, drier weather. But in some southern sections the insulation on poorly sealed boxes wears out.

(Continued on page 52)

Every Second
OF THE DAY
Triple inspection, at the machine, at the bench and during selective fitting means that every second of the day someone in the Tecumseh plant is checking and rechecking Chieftain parts to give you the finest precision built refrigeration units made.
TECUMSEH PRODUCTS CO.
TECUMSEH MICHIGAN
Chieftain

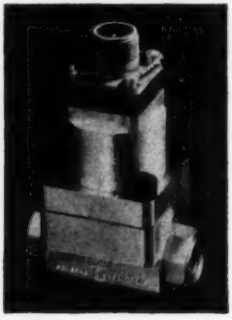
New and Improved Appliances

Information contained in this department is furnished by the manufacturer of the article described and is not to be construed as the opinion of the Editor.

General Controls New Series of Valves

A NEW series of electric valves designated as Series PV, specifically designed for positive valve operation on moving equipment and vibrating machines, is announced by General Controls Co., Glendale, California.

Applications claimed for the valve are numerous and include airplanes, buses, trucks, tanks, tractors, railroad cars, ships, boats, machine tools, etc.



General Controls Type PV-3 Valve.

Series PV electric valves are completely new in design and should not be confused with modified stationary valves or alternating current type valves. The main consideration governing their design was to provide positive operation regardless of vibration, movement, or substantial increases in acceleration (as expressed by factor "g").

Valves are generally of the two-wire current failure type, designed for compactness and low weight. They will handle all types of liquids, gases and vapors, including refrigerants, greases, gasoline, alcohol, anti-icing fluids, etc., under pressures from a fraction of a pound to 1500 pounds or more. Operation in any position, packless, drip-proof design, and minimum current consumption are additional advantages.

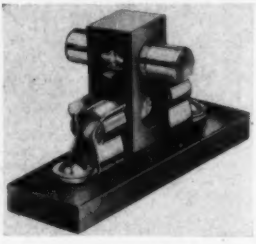
Their application to airplanes makes it possible to save weight and simplify many tubing and piping arrangements, for these new valves often weigh little or no more than units they replace, and eliminate heavy operating gear. Low current consumption, minimum control wiring, compact size, light weight, and remote operation make it possible to eliminate valves and piping from crowded instrument and control panels. Control of gasoline fuel for heaters or engines, or transfer control is conveniently handled by these valves. Hydraulic control, positioning or on and off, normally open or normally closed, single way or three or four way selector valves at pressures of 1500 pounds or more, are entirely practical. Amplitude and speed of vibration or acceleration factors (available to in excess of 100 x "g") are designed to meet individual applications.

Series PV Valves are fast operating and free of sliding parts. An inserted magnetic break in both poles insures against failure due to magnetic residual. Limited armature movement assures long life. Open, airplane or conduit connections are available.

Further details may be obtained by writing the manufacturer, General Controls Co., 801 Allen Avenue, Glendale, California.

Fuse-Changing in Close Quarters

AN entirely new convenience for changing fuses in close quarters—replacing a blown fuse in a twinkling—and giving notice on inspection that another spare is required, are features compactly embodied in a Spare Fuse Holder & Puller combined, just announced by Littelfuse, Inc., 4797 Ravenswood Ave., Chicago.



These new devices are applicable to all 4 A G and 5 A G fuses. The fuse in circuit goes through one end of the soft rubber rectangular Littelfuse Holder, between the clips. Above, and at right angle, is an opening in the Holder for the spare fuse. When inserted, the caps of the spare fuse project beyond the Holder affording an easy grip for two fingers.

When the fuse in circuit blows, all the operator has to do is to pull and reverse the Littelfuse Holder. This puts the spare fuse in circuit and brings the blown fuse on top in the same position that the spare was in before. The change is easily made in a moment.

One end of the Littelfuse Holder & Puller is painted red. Until a fuse change is necessary, the red end is underneath, out of sight. When a reverse is made, putting the spare fuse in circuit, the red end is brought into full view on top. To an inspector or service man this red signal instantly indicates that a fuse has blown and that another spare is required. If the end is black both the fuse in circuit and the spare are still servicable. Fuses are easily removed and replaced.

"Windows" in the Spare Fuse Holder & Puller keep the elements of both fuses in view at all times.

NO GASKETS

NO SOFT SOLDER

NO LEAKAGE

NO ORGANIC FILTERS

NO FELTS

NO STOPPAGE

★ WEATHERHEAD ★

SILICA GEL DRYERS

Rechargeable and Non-Rechargeable types
Tested to withstand 250 pounds pressure

THE WEATHERHEAD CO.

300 EAST 131st ST., CLEVELAND, OHIO

Refrigeration Valves, Fittings and Accessories

The Question Box

Readers are invited to send their problems pertaining to the servicing of household refrigerators and small commercial refrigerating equipment to "The Question Box."

FRIGIDAIRE NEEDS FREON

QUESTION 470: I have a Frigidaire household refrigerator, a low side float job, charged with F-12 or Freon, and it is short of gas. Would it work satisfactorily if I added some SO_2, or would it be better to change to sulphur and change the float valve? The unit is a pound short of gas, and I cannot get F-12.

I also have a General Electric, Type CB3-B16, which contains 2.5 pounds of sulphur dioxide. The throttle device is not working, and I would like to know if an expansion valve would work on that kind of machine. The compressor is in good condition. Would the cooling coils have to be changed?

ANSWER: According to the OPACS order governing Freon, sufficient is supposed to be released immediately for all replacement purposes in the refrigeration field. In order to secure it, however, it is necessary that you go to your jobber and fill out form PD-1, which your jobber can then use as a means of replenishing his stock. However, your jobber can supply you for your immediate needs from his stock. I would suggest that you endeavor to follow this routine and fill out the form regardless of whether your jobber has Freon in stock, because it will, at least, help him to secure a supply which you may need in the future.

A complete write-up on this particular subject was contained in the September issue of THE REFRIGERATION SERVICE ENGINEER. Briefly, I would say that you can ad a little methyl to this Frigidaire system to make up the shortage, providing you are sure there is no aluminum in the system. Aluminum was used in quite a number of Freon systems, both in compressor parts and in the evaporators and fittings. There is a reaction, however, between methyl chloride and aluminum which will create a dangerous condition. Therefore, the necessity of being sure no aluminum is contained in the system.

A small amount of sulphur could be added without any fear of chemical reaction between the two gases, but because separation of the two gases will occur, due to a distillation process, you would very likely have trouble with fluctuations of pressure and temperature.

To change the system to methyl chloride entirely would necessitate changing the float, because methyl chloride is considerably lighter than Freon, and of course, it would be necessary to remove any aluminum that might be in the system.

Changing to sulphur dioxide would not require any change in the float, but the capacity of the system would be reduced very nearly thirty per cent, and it would be necessary to speed up the unit to offset this reduction in capacity. Whether or not this particular unit will stand a thirty per cent increase in speed is more than I know. However, you may be able to determine just what it would stand.

With regard to the General Electric unit, the throttling device on these units is a high-side float, and an expansion valve would not work satisfactorily in its place, unless the evaporator was changed to a continuous tube type. The evaporator on the General Electric is a flooded type, and there is no continuous passage through it. Rather than making such a change, I would think it would be a better idea to secure a small replacement highside float and replace the General Electric with it.

SLUDGE IN METHYL COMPRESSOR

QUESTION 471: A problem has recently come up that is new to us. That is the formation of wax in methyl chloride ice cream cabinet compressors.

We have for the last several years, taken care of all service on a 12-hole Nelson ice cream cabinet using a ½-h.p. Universal condensing unit, and an Anheuser Busch hardening cabinet using a Copeland 1½-h.p. unit. Just recently we obtained a rebuilt Universal compressor from Hussmann in St. Louis and installed it on the Nelson cabinet. It ran o.k. then for several weeks until it began to stick. We found a large quantity of wax in it. Now the Copeland is beginning to do the same thing.

We have never added oil to either machine. We have never added any gas to the Nelson, but we have added gas to the Copeland about twice, I think. There is only

★ ★ ★ ★ ★ ★ ★ ★ ★

OUR PROBLEM - - AND YOURS

» Approximately 95% of our total productive capacity is now devoted to the fabrication of priority orders. We are doing our utmost to provide our regular customers with materials for essential civilian uses within the remainder of our 24-hour, 7-day week production schedule.

» Both you and ourselves must operate on a "minimum practical working inventory." This means that we have not had the opportunity of building an appreciable stock.

» Conservation order M-9-C limits the total amount of civilian production requiring either copper or copper base alloys.

» The actual acute shortage of raw materials is a decidedly limiting factor in the amount of material available to us for fabricating essential civilian requirements (non essential products have already been entirely eliminated.)

» Advance planning and regular production schedules have practically disappeared. The manufacture of any order without a preference rating is very much a "catch as catch can" procedure. Our Government has first claim on the use of our machines and our man power. Therefore, although we may be able to secure materials and may be permitted, under the existing restriction orders, to produce your goods, we may not have the necessary machines available to do so, because these machines are, by far the greatest part of the time, continuously on production of war materials.

» We Americans, no matter in what walk of life, realize that armament work must come first. IT MUST TAKE PRECEDENCE OVER EVERYTHING ELSE IF FOR NO OTHER REASON THAN THIS—THAT WE MAY PRESERVE FOR THE FUTURE THOSE VERY BUSINESSES OF WHICH WE ARE NOW TEMPORARILY DEPRIVED. If we fail, everything is lost—our businesses, our freedoms and our democratic way of life.

» To the extent we are permitted and to the machine capacity we have available or can procure, we shall continue to the very utmost of our ability, to produce standard essentials for our customers and the Refrigeration Trade.

MUELLER BRASS CO., PORT HURON, MICH.

one thing in common to both machines that we have noticed, and that is, they both regularly frost the suction line for several minutes at the start of each cycle.

If you have any information that will help us solve this problem, we would be very glad to receive it.

ANSWER: The formation of wax in methyl chloride systems is not by any means new, particularly in low temperature applications such as ice cream freezing and hardening. However, I have not heard of the wax forming in compressors, and I'm wondering if what appears to be wax is not a gummy sludge which tends to stick up the compressor.

Wax formation is usually noticed at the expansion valve and will cause the expansion valve to clog up, while no difficulty will be noticed at any other point in the system. An oil may be specified as wax-free, and in all probability, it will be free of wax in itself, but when it is mixed with methyl chloride, under certain conditions, wax will separate in varying amounts. Of course, some oils will produce more wax than others, and it is for this reason that in low temperature work, only the oils specified as wax free should be used.

Oil Separator May Help

One way of overcoming this is to use an oil separator which will cut down the amount of oil circulating through the system, and further to change the oil to the best grade obtainable. It is rather difficult to determine just what in any particular system may cause the wax separation, and for this reason, it is suggested that a sample of the oil be tested to determine whether or not it is sufficiently wax-free when mixed with methyl chloride.

For a very complete discussion of this subject, I would refer you to Vol. 2, Nos. 1 and 2, Ansul News Notes. The entire subject of wax formation was very thoroughly discussed in these two bulletins, and certain recommendations were made. I'm sure you will gain much helpful information from them. Ansul Company also invites anyone to send them samples of oil on which they will run a wax-separation test and provide you with the results, plus any recommendations they may have.

If the material you refer to as wax is actually a sludge gum, it is very likely that it is caused by moisture plus rather a hot condenser and liquid line. High head pressures, small liquid lines, too much pressure on the discharge valve, and various things of that nature which may cause a very high velocity of the gas, plus high discharge temperatures, will very often cause the oil to break down into a sludge of this nature.

CHANGING FROM AMMONIA

QUESTION 472: I would appreciate very much any information you can give me as to how to go about removing ammonia from a system in order to install a sulphur dioxide system using the same coils.

ANSWER: As you probably know, water will absorb ammonia. Therefore, in removing ammonia from a system you can purge it out into a barrel of water, and in this way, the ammonia will be absorbed.

After you have purged as much as possible from the system, it would be well to pump a vacuum with the existing compressor to the lowest point possible, allowing the discharge from the compressor to be blown into the barrel of water.

During this time, the evaporator should be permitted to warm up to atmospheric temperature to be sure that there are no pockets of ammonia trapped anywhere in the system.

As a further precaution, when you are cracking the first connection preparatory to dismantling the system, the connection should be carefully cracked so that it may be immediately tightened should any signs of escaping ammonia appear. Accidents can happen in dismantling these systems, due to pockets of ammonia being trapped under oil or in low points of the system.

When the system is opened up to atmospheric pressure and some little movement of the part causes the ammonia to release from the pocket, there is a possibility of your being sprayed with liquid ammonia which, as you know, will burn quite severely.

Apparently, you do not intend to use any more than the coils of the system in the new installation. Therefore, it will be necessary only to treat these coils for the thorough removal of ammonia. To be absolutely sure of removing all the ammonia, the best method is to circulate water through them, and the water will, of course, absorb any ammonia left in the coil.

However, it seems unlikely that there will be any more than a little vapor ammonia in the coil after you have done the amount of work necessary to dismantle this system. Therefore, I believe it would be sufficient to blow out the coils with CO_2, thus removing any ammonia or oil that may be trapped therein.

Perishables must be Protected!

This Is Refrigeration's Part in National Defense

National Defense requires every industry to do its part in the conservation of materials and manpower. Strangely enough, however, this is the basic reason for mechanical refrigeration's very existance...to protect the perishable effort of manpower with a minimum of spoilage!

That is why Sporlan has developed selective charged thermostatic expansion valves with the clearly identified symbols U-Z-K-L-G-C and O. For Sporlan engineers were first to prove that no one charge can *perform perfectly* on several types of installations.

When determining the thermostatic expansion valves to be used on refrigeration and air conditioning installations in this united effort to defend our nation...be sure to think in terms of perfect performance.

SPOEHRER-LANGE COMPANY

Manufacturers of Sporlan Selective Charged Valves for Perfect Performance on All Installations

3725 COMMONWEALTH AVE. SAINT LOUIS, MISSOURI

CONTROLLING FAN OF BLOWER COIL

Question 473: In an installation of a blower coil for a walk-in cooler where this coil is the only one refrigerated by the condensing unit, what is the best method of control for defrosting having intermittent operation of the fan?

The condensing unit is pressure controlled. Would a temperature control only for the fan, do the job? What would be the best location for the thermal bulb?

As the condensing unit is a one and a half ton and was originally intended for two blower coils, each of the same size as the one to be used, would it be advisable to also have a solenoid valve installed in the suction line? If so, how should the solenoid be made to operate, independently or at the same time as the fan? Would a snap-action two temperature valve of the pressure operated type be of any use?

Your advice on this matter will be appreciated.

Answer: The best way in my opinion to control a blower coil in a walk-in cooler is through a thermostat. The type of thermostat you use will depend upon what work you wish it to do.

To control the on and off periods of the fan, a room type thermostat or air switch attached to the wall of the refrigerator would be all that is required. If, however, you wish it to control the temperature of the coil as well as the temperature of the cabinet, one of the dual temperature controls, such as sold by Ranco, Inc., or Penn Electric Switch Company, would be satisfactory.

I don't know what you are referring to when you ask for the best location of the thermal bulb. I presume you mean the bulb of a cold control and the above paragraph will answer this question. In other words, if you are using a room type thermostat, there will be no thermal bulb to contend with. I take it from your description that the condensing unit is just twice too large for the blower coil you are using and if this is the case I am afraid you will never secure satisfactory operation with such a combination. The system would be too much out of balance to operate satisfactorily.

You would probably experience an extreme short-cycling condition and you would probably have trouble with the suction line frosting to an excess. It would be almost impossible to obtain a satisfactory adjustment on the thermal expansion valve and there would probably be considerable fluctuation in temperatures. If this is intended to be a permanent hookup, it would seem advisable to secure a condensing unit that would be more nearly of the proper size. If the hookup is temporary and it is the owner's intention to expand at a later date and install additional load on the unit, then it is possible that you can reduce the speed of the unit or cut out one cylinder so as to create a better balance between condensing unit and coil.

A snap action two temperature valve is never used in a single coil system. They are intended for use only on multiple systems where two temperatures are to be maintained with one condensing unit.

A solenoid valve, likewise, is not necessary since they are intended usually for multiple systems.

BUILDING A LABORATORY COOLER

Question 474: I have a laboratory cooler to build and would like to get all the information you can give me to make a good job.

I have a General Electric refrigerator, Model R-52, a 5 foot box which I want to change by taking the freezing unit out and putting in two cold plates for shelves, or would copper tubing soldered to a plate give me good results? If so, what size tubing and how many feet will it take for each shelf? I would like to keep this box at zero temperature. It is to be used for cooling crude oil samples and there will never be more than three gallons cooled in one day and the box will be opened once or twice a day.

What size compressor unit will it take to do this job? Do you think this box will do for this job or will I have to build one with thicker walls?

Please give me the address where I can get cold plates.

What size thermostatic expansion valve will it take for this job and what gas would you use?

Answer: I don't believe that a General Electric domestic type of cabinet would be satisfactory for such low temperature work as 0° F. These cabinets have only 2 or 2½" of insulation, whereas a box for 0° F. should have at least 4" and would be better if it had 6" of insulation.

Rather than trying to construct a box of this nature, I believe you would get better results if you contacted the Jewett Refrigerator Corporation, 2 Letchworth Street, Buffalo, New York, and ask them if they can supply a cabinet designed for 0° F. If they don't have what you require, the second

On its way to the job . . .

This Lectrodryer, built by Pittsburgh Lectrodryer Corporation, stopped over at the Chemical Show in New York for a week's exhibition. But it moved right on again, and is now at work for a nationally known manufacturer of bottled gases.

Charged with Alorco Activated* Alumina, and working at a pressure of 600 pounds per square inch, this machine removes moisture from compressed gases to a dew point of −110° F.

You get this same efficient, dependable drying service on your refrigeration work when you employ cartridges and dehydrators charged with Alorco Activated Alumina. And, because Activated Alumina removes all acid and sludge from a refrigerating system, corrosion is prevented and wear is reduced.

Remember to specify "Alorco Activated Alumina". Your supply house can take care of your requirements. ALUMINUM COMPANY OF AMERICA (*Sales Agent for* ALUMINUM ORE COMPANY) 2159 Gulf Building, Pittsburgh, Penna.

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These manufacturers supply cartridges and dehydrators charged with Activated Alumina:

American Injector Co. . . . Fedders Mfg. Company . . . Henry Valve Company . . . Imperial Brass Mfg. Co. . . . Kerotest Mfg. Company . . . McIntire Connector Co. . . . Mueller Brass Company . . . Cyrus Shank Company.

choice would be a two hole or four hole ice cream cabinet, or any cabinet used in low temperature work constructed in such a way that the opening is at the top.

If your customer can use a cabinet of this type with the opening at the top I believe it would be more satisfactory for low temperature work because there would be much less heat lost through the opening while the box is open and because such construction is easier to insulate. The cold plates you intend to use for the evaporator could be placed vertically on the walls of the cabinet and baskets used instead of shelves.

Either Methyl Chloride or Freon would be suitable as a refrigerant. The thermal expansion valve should have an orifice size of .028 or .035. A thermostatic control, I believe, would be more satisfactory than a pressure control because you are mostly concerned with cabinet temperatures rather than humidity conditions or cycling conditions.

I am not able to give you any figures on unit sizes or cold plate sizes until you have definitely determined what kind of cabinet and what size cabinet you will be using.

It would seem that if the cabinet is to be no more than five cubic feet and is to be insulated with at least 4" of insulation that a ⅕ horse power unit should handle the job satisfactorily.

REPAIRING AN AMMONIA COIL

Question 475: I would like your opinion on how best to make the following repair.

A local ammonia plant has a leak in an evaporator coil. The leak is a crack about 1½ inches long on the outside of a return bend, presumably caused from strains set up in making the bend. The coil is of 2½ inch galvanized pipe. The bad section can be cut out and replaced with fittings but we would like to try welding.

The points I would like advice on concerns the strength of the weld on galvanized pipe and the possibility of explosion. The actual welding will not present any difficulties and will be by far the quickest and cheapest method of making the repair.

Compressed air is available to blow out the coil. Carbon Dioxide could also be used if that would overcome explosion danger.

Answer: I, too, believe that your best method of repairing this evaporator is by welding. Welding would be the simplest way of making the repair and would provide the strongest, most leak-proof repair. The surest way of overcoming the explosion hazard is to circulate water through the coil. Water, as you know, absorbs ammonia so that this would be the surest way of removing any trace of ammonia in the coil.

In addition, the water would carry away practically all the oil that may be trapped in the coil. The oil, I believe, is just as important as the ammonia since oil vapors can cause an explosion when open flame and heat is applied.

Your problem in using water would be getting the coil dry again after the job is completed. Blowing out the coil with CO_2 would remove most of the free water and perhaps in this manner you could secure a dry enough coil for your purpose. The particular design of coil, its size, length, etc., will more or less govern the difficulties you may have in cleaning it out properly and drying it after the cleaning.

It is quite probable that blowing the coil out with CO_2 only will provide the safe conditions you require. If the coil was permitted to warm up to atmospheric tempera ture, then pulled down to a low vacuum, it would seem that you would be reasonably sure of removing all the liquid ammonia. Blowing it out then with CO_2 would replace any ammonia vapors with CO_2 gas, thus removing any danger of ammonia explosion. The CO_2, however, may not remove any oil pockets in the coil and when heat is applied, there may be sufficient vapor rising from this oil to cause dangerous conditions. Here again I believe the construction of the coil will govern your actions. If it is such that traps in the piping are apparent, then I believe I would play on the safe side and use water to circulate through the coil.

I do not recommend the use of compressed air or anything else but Carbon Dioxide for blowing out the coil.

S S S

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St. Louis, Missouri

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Elvin Thompson
Sigourney, Iowa

I find several helpful suggestions in your magazine and couldn't do without it.

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*Address*_____

*City*_____ *County*_____ *State*_____

CONSERVE POWER

(Continued from page 40)

It is possible to have boxes re-insulated and properly sealed. Now that refrigerators use strategic materials in their manufacture, it is advisable to save both your own income and National Defense supplies by fixing up the old box so that it will operate efficiently.

9. Keep your box at the proper temperature.
The milk compartment, right next to the ice tray unit—should be kept from 40 to 45 degrees. Your refrigerator manual will probably tell you where your control dial should be set to maintain that temperature. If you've lost your manual or are in doubt about the temperature, get a *refrigerator thermometer* from the hardware or dime store and test your box yourself. If the milk compartment is below 40 degrees you are keeping your box too cold. If it is above 45 degrees you aren't getting proper refrigeration.

10. Don't pack your refrigerator full of food, packages and cans.
Free circulation inside the box is very important to adequate refrigeration. Don't make a pantry out of your refrigerator. Everything you put in takes electric power to cool.

It is a good practice to remove tops of vegetables before putting them in the refrigerator to keep. Also be sure to remove all paper wrapping and bags. When you are putting away left-over foods, put them in the smallest possible dishes. It takes electric power to cool down bowls, pans and containers as well as food.

Don't keep canned goods in the ice box unless you want them chilled for serving. It is not necessary to keep all fruits in the refrigerator. Bananas, unless they are ripe to the point of being over-ripe, should never be refrigerated. You may want to chill your oranges overnight for breakfast. If you do, place in the refrigerator only the number you are going to use the next morning.

Never put liquids or moist food in the box without covering them. The refrigerator will evaporate them and the moisture will freeze into an ice covering over the refrigerating coils in the unit at the top of the box.

11. Be sure that the outside door, hinges, and door catch work properly.
The rubber gasket which fits around the outside of the door serves to keep the box air tight. Inspect it every now and then to see that it is doing its job. To test the gasket, lay a slip of paper on the edge of the rubber and close the door. If the paper can be easily pulled out, it is allowing warm air in the box.

Your door catch must be firm and the door hinges in good condition.

R.S.E.S. Convention Postponed

8th Annual Convention Will Be Held Later. Plans Going Ahead for Most Important Convention of Service Engineers—Jobbers Also Postpone Meeting—REMA Cancels All Industry Exhibit for 1942

ACTING without delay in the interests of "all out" effort following the declaration of war by the United States on December 7th, the directors of the Refrigeration Equipment Manufacturers Association announced December 11th the cancellation of the 1942 All Industry Refrigeration and Air Conditioning Exhibition. At that date more exhibition space had been reserved than at any previous exhibit, but it was felt that the best interests of our country could be best served by dispensing with the exhibition. It was then planned to hold an All Industry meeting without exhibits with the participating associations and societies holding their convention as planned on the original date of January 12th.

The declaration of war immediately placed further restrictions upon the procurement of materials for civilian requirements. Due acknowledgment in the meantime had been made by officials at Washington of the essential nature of refrigeration equipment service and maintenance in the preservation of perishable food stuffs.

New Repair Order Expected

Several important orders relating to the industry are, as of this date, pending in the Office of Production Management which are expected to be acted upon within the immediate future. Naturally, these orders will affect the production of new commercial equipment. A new repair order, assuring supplies for the maintenance of existing equipment, will be issued very shortly. This order will be of the utmost importance to every individual and organization engaged in the servicing and maintenance of refrigeration equipment.

On December 27th, recognizing the far reaching effect of these new orders, the Refrigeration Service Engineers Society issued a formal statement to its membership as follows:

Three books

you should have . . . . . .

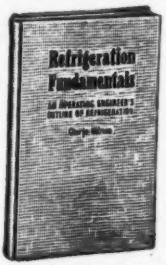
● Every service man, refrigeration engineer or salesman should have these 3 books in his library. Inexpensive and entirely practical they'll help you to earn more by "learnin'" you more.

COMMERCIAL REFRIGERATION and COMFORT COOLING

by S. C. MONCHER

Here is a book that shows you in an easy-to-understand way How to Calculate Refrigeration Loads. The author through his wide experience in the refrigeration field is thoroughly familiar with the problems encountered in the field by refrigeration service and installation engineers, refrigeration equipment salesmen, architects, and others with a general knowledge of the field who are interested in gaining a more thorough understanding of the commercial refrigeration and comfort cooling industries as they exist today.

Price..... **$1.50**



REFRIGERATION FUNDAMENTALS

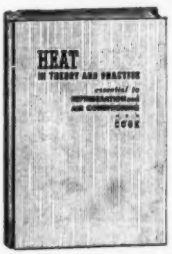
by GEO. HOLMAN

Here's an unusual book that makes the Theory of refrigeration easy to understand. The author is first of all a practical engineer. This book is the text he would have liked to have had when he first started the study of refrigeration, but nothing like it has been available until now. Unlike most authors of books on technical subjects, Holman has an interesting and logical style in expressing his thought. Even if you are already an expert engineer you will enjoy reading his unorthodox explanations, and he will undoubtedly give you a new slant on the subject. If you are just starting the study of the fascinating and complex subject of refrigeration, Holman's unusual book will give you a clearer picture of what you are going to learn.

Price..... **$2.00**

Broaden your understanding of Refrigeration, by learning more about HEAT . . .

In writing this book it has been the aim of the author, Dr. S. R. Cook, to produce a book on heat and its relation to refrigeration and air conditioning, which would be instructive to anyone interested in this field, and at the same time readily readable. The purpose is to give information essential to solution of problems that may arise in the operation of refrigeration and air conditioning machinery or for the student in his study of the science. A portion of the book is given over to definitions of terms used in heat and refrigeration and air conditioning, and to tables of heat constants which will be found very useful.



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CHICAGO • ILLINOIS

Chicago, December 27—Considerable confusion has resulted regarding the dates of the 8th Annual Convention of the RSES, originally scheduled for Chicago, January 12-14, 1942. As you have been previously informed, the Refrigeration Equipment Manufacturers Association *cancelled* the 1942 All Industry Refrigeration and Air Conditioning Exhibition in the interests of contributing an "All Out" defense effort in our present national crisis. However, in that announcement it was stated that in all probability an All Industry Convention might be held of all participating associations and societies *without exhibits,* or possibly with a uniform "clinic" type of booth providing an opportunity for exhibitors to meet their service engineer customers. It was hoped that it might be possible to hold this convention on the dates originally set, provided certain arrangements could be made to secure key government *"Office of Production Management"* officials in charge of the regulations concerning our industry and particularly our service and maintenance group.

NEW REGULATIONS WILL GOVERN SERVICE WORK

Since this action of cancelling the exhibit, I might state that important events, having a direct bearing upon the conduct of the service business during the present war, have been occurring with considerable rapidity. I want to assure you at this time that your National Secretary's office is in constant touch with these developments and our membership will be informed at the earliest possible moment definite information is available.

It appears at this time very evident that all refrigeration service and maintenance contractors will be certified by the government in order to secure a preference rating for repairs and parts for existing equipment. I can only say that this activity is of the greatest importance to us as this regulation may determine who can specifically remain in business.

R.S.E.S. BOARD OF DIRECTORS ORDER CONVENTION POSTPONED

Considering this development, your Board of Directors have carefully weighed the situation regarding our convention plans and recognize that it is of the utmost importance to secure, if at all possible, direct information at our convention as to exactly how the service business will function under the new order. It is very probable that such speakers will be available at a date somewhat later than our original convention date. It is planned that this meeting would be an All Industry meeting with service men, jobbers, and manufacturers participating in a full day's session and the other two days of our convention devoted to Society business.

Therefore, by action of the majority of the Board of Directors, the 8th Annual RSES Convention is postponed until final arrangements can be made to bring this vital information by government officials to us personally. It is hoped that under favorable circumstances it may be possible to re-schedule our convention within two to four weeks after the original date of January 12. This information, of course, with an outline of the program, will be sent to you as quickly as it is definitely ascertained.

May I urge you at this time to make your plans as flexible as possible in order to attend this convention. *It's most important to your business.* Watch for the announcement of the definite dates and programs of your 8th Annual RSES convention in Chicago.

H. T. McDermott, Secretary.

The 8th Annual Convention of the Refrigeration Service Engineers Society will undoubtedly be the most important meeting of service men held, and invitations are being extended to non-members to participate in this convention.

The industry is unified in its desire to serve to its fullest capacity in the present emergency and the R.S.E.S. convention dates will be announced to coincide with the meeting dates of the National Refrigeration Supply Jobbers Association and the Refrigeration Equipment Manufacturers Association. The combined meeting will be known as the All Industry Convention and it is expected that the three principal organizations, as well as others, will participate in a one day All Industry Convention, at which time it is anticipated that important officials representing the Office of Production Management and others will outline the regulations governing the future operation of all branches of the industry during the emergency.

The Refrigeration Service Engineers Society will hold its regular three day convention program. In addition to the "All Industry Day" the other two days will be devoted to the business of the Society as well as important educational programs to fit in with the present day's requirements in the successful operation of the service business.

The announcement of the 8th Annual Convention of the Society will be made within the very near future.

Non-members of the Society may write to the National Secretary's Office, 433 North Waller Avenue, Chicago, Illinois, to be placed on the list to receive the notice regarding the definite announcement of the R.S.E.S. convention dates.

NANCY ANN GARDNER FIRST BLACKOUT BABY

NANCY ANN GARDNER, daughter of Mr. and Mrs. George Gardner, arrived at 9:05 P.M., January 5, just in time to win the title of Schenectady's first blackout baby.

Born during the first blackout test in Schenectady, Nancy Ann can now claim distinction and importance among the other inhabitants of the hospital nursery. She records a weight of six pounds, eleven ounces and both she and her mother are doing fine with no ill effects from the unusual conditions surrounding the arrival.

George Gardner is a member of the Hudson Mohawk Chapter and has for several years taken a very active interest in Society work both locally and nationally.

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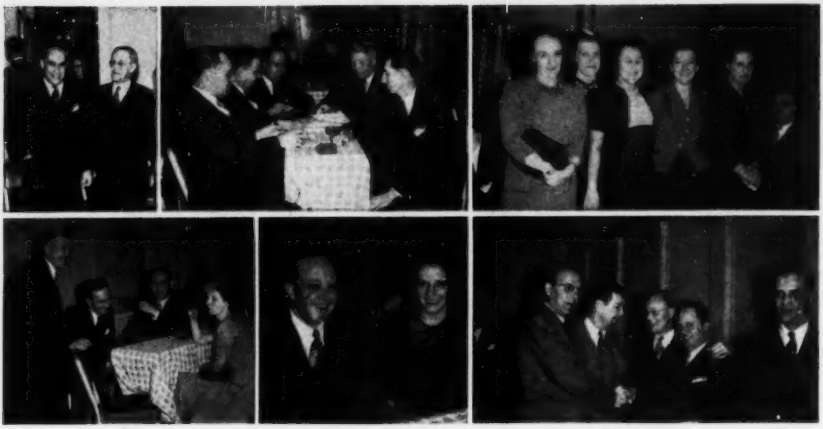
Two New Chapters Join National Society

SOUTHERN OHIO CHAPTER

A GROUP of service engineers from the Southern Ohio area recently met to form a local chapter of the R.S.E.S. Several of the members, who were formerly associated with Tri State Chapter recognized that additional membership benefits would be gained by the formation of a chapter to serve a local area. The National Society was petitioned for a chapter to be designated as Southern Ohio Chapter. At a recent meeting the following officers were elected: President, Forrest D. Poole; Vice-president, Raymond Steiner; Secretary, George P. Kaut; Treasurer, Homer Hall; Sergeant-at-Arms, W. K. Rea; Board of Directors, Francis Overman, Carl Ackley, Olin McKay, Earl Minch and Russell Hissam. The members of Southern Ohio Chapter consist of: Carl Ackley, Homer Hall, Russell Hissam, George P. Kaut, Olin McKay, E. L. Minch, Francis Overman, Forrest D. Poole, W. K. Rea, and Raymond Steiner.

CENTRAL CONNECTICUT CHAPTER

ACTING in the interests of closer cooperation, service engineers of Hartford, Conn. and vicinity have held several meetings and recently formed a new R.S.E.S. chapter which will be known as Central Connecticut Chapter. This chapter will include many service engineers who have been desirous of affiliating with the National Society through a chapter and invites the participation of other refrigeration men located in and adjacent to Hartford. The following members have affiliated as charter members: Arthur W. Andreen, James F. Bagley, Charles H. Bidwell, Howard E. Bidwell, James E. Felix, Leo Helenski, Edmond Logan, George A. Morin, Harold R. Morin, Leon R. Morin, Charles E. Murphy, Jr., John A. Paar, C. H. Riedle, Richard H. Stabert, John Warner, P. A. Wentworth and J. Everett Wilkinson. Mr. Richard H. Stabert is Secretary Pro-Tem, 97 Austin St., New Britain, Connecticut. It is expected that the chapter will receive its charter very shortly.



HERMAN GOLDBERG'S ANNUAL CHRISTMAS PARTY

Herman Goldberg's Annual Party, held December 11 at the Stevens Hotel, Chicago, was, as usual, a complete success. Approximately 800 people were in attendance and everything but the drinks were on Herman. The crowd gathered later than usual, probably because they were reluctant to leave their radios so soon after our declaration of war, but after they arrived, they immediately entered into the fun of the evening and continued to an unusually late hour. Entertainment for the evening consisted of six star acts providing an excellent two hour floor show. Ten prizes were awarded to winners of waltz and jitterbug contests and eight door prizes were given out. Winners of the prizes were: Mr. and Mrs. Fred Olds of Chicago; Bob Stewart of Evansville; Miss Peggy Friend of Dubuque, Iowa; Alice Patterson of Chicago; James Kline of Springfield, Illinois; Mrs. Doris Dresback of Bloomington, Illinois; G. J. Hildebrand of Chicago; Miss Jeanette Selgan and Miss Lynn Horn of Chicago.

The host of the party, Herman Goldberg, is shown in the upper left hand picture. Irving Alter of the Harry Alter Company was the photographer.

THIRD ANNUAL R.S.E.S. YEAR BOOK NOW BEING DISTRIBUTED TO MEMBERS

JUST off the press, the Third Annual R. S. E. S. Year Book of 104 pages is being mailed to members in good standing of the Society. The Year Book contains considerable information in handy form that will undoubtedly be referred to frequently. The contents of the Year Book include a list of all of the members, a directory of the chapters and definitions commonly used in the refrigeration industry.

The Year Book is divided into five principal sections under the following headings: Fundamental and Basic Principles, Applications, Selecting Low Side, Installation and Service. In the Service section the latest information obtainable regarding the refrigerant and oil data, the motor size and refrigerant control, as well as belt size is given. The book is 6" x 9" in size and substantially bound.

In addition to the distribution to members it will be sent to national manufacturers and officials in government departments interested in refrigeration.

IDEAS

If you have an idea
And I have an idea
We each have *one* idea

If you tell me your idea
And I tell you my idea
We each have *two* ideas

Now here is my idea—
Exchange your idea
For many ideas
By joining the RSES.

R.S.E.S. Chapter Notes

TRI COUNTY CHAPTER

November 7—The winner of the attendance prize for the evening was Art Wolff, the amount of $2.50. The scheduled educational program was to have included a talk on evaporative condensers, however this speaker had been cancelled and the meeting took on the form of a round table discussion. A pleasant surprise in the form of a bear stew furnished by Art Wolff as a souvenir of his recent hunting trip awaited the

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members following the meeting.

November 27—The educational program consisted of oddities in refrigeration. Among these were: keeping trout alive by refrigeration. In this it was explained that lake trout cannot live in water warmer than 60°, therefore a window display was cooled by a coil in a reserve tank of spring water which was then circulated through the window display. Another oddity explained was that of the Tromp Air Compressor using the venturi tube principle for compression of air. The installation of an ammonia freezer room where neither water nor electricity were available was the third oddity.

December 5—The educational feature of the evening was a film prepared by General Electric Company, showing various methods of measuring electricity through the watt meter, volt meter or ammeter. J. B. McGuan was winner of the attendance prize, the amount being $4.00.

December 19—During the business session of the evening an election for delegate and alternate to the national convention was held. N. H. Rust was elected delegate and L. P. Millen, alternate. The chapter voted to pay a part of the expenses of these two delegates.

PITTSBURGH CHAPTER

December 12—The main part of the business session was taken up with the annual election of officers which resulted in the following: *President*, S. Paul Riddle; *Vice-president*, Herbert A. Biber; *Secretary*, Charles C. Terrill; *Treasurer*, A. A. Hoerner; *Sergeant-at-arms*, John Scrabak; *Educational Chairman*, Wesley Barnes; *Board of Directors*, W. F. Garner, Vernon Black & Albert Ross.

On the educational feature, Frank House and Cliff Hudson presented a discussion on soldered fittings and then sponsored a soldering contest. Mr. Herman was winner of the contest with Vernon Black and Paul Melbling taking the next two highest places.

VIRGINIA CHAPTER

December 5—The meeting was called to order by the president and one of the first orders of business was the election of a Sergeant-at-Arms. H. J. Duke was elected. Some discussion on the forthcoming national convention took place.

December 19—R. W. Lampie was elected delegate and A. V. Carey, alternate for the coming convention. A resolution was drawn up offering the services of Virginia Chapter

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and its members to the Virginia Defense Council. A discussion on priorities occupied the balance of the evening.

ROCKFORD CHAPTER

December 15—During the first part of the business session, secretary Don Starin tendered his resignation, explaining that it was his intention to leave the refrigeration field and offer his services to the War Department. The chapter voted to accept his resignation and elect a new secretary. The election followed the usual routine and Leslie Sturch became the new secretary. It has long been the practice of the chapter to offer an attendance prize at each meeting, but after some discussion it was decided that in the future attendance prizes would be paid in defense stamps instead of in cash as was done heretofore. Ed Reynolds was the winner of the attendance prize at this meeting.

SPRINGFIELD CHAPTER

December 18—The meeting was preceded by a pot luck supper served in the home of Mr. and Mrs. J. J. Kline. R. M. Potter, President, called the meeting to order following the dinner and the usual business routine was followed. Archie Fait was elected delegate to the national convention and J. J. Kline, alternate. A discussion of future entertainment resulted in the decision to hold a supper preceding the meeting each month for the next three months. During the course of this meeting, the ladies entertained themselves by playing cards.

October 29—A wiener roast preceded the meeting with the ladies as guests of the men. The meeting which followed was presided over by President Potter. Both the roast and meeting were held at Washington Park Field House. Archie Fait was elected to represent the chapter in the state association. President Potter then introduced the newly elected President of the State Association, J. J. Kline, who is also a member of Springfield Chapter.

MISSISSIPPI VALLEY CHAPTER

December 2—The entire meeting was devoted to business among which was a discussion of a forthcoming talk from Mr. Wilson, Rock Island Electrical Inspector who had been scheduled for the next meeting, but was unable to attend. The secretary was instructed to ask Mr. Wilson to set his own

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date. The secretary was also to notify all members of the forthcoming election of convention delegates. A suggestion was made that other towns be selected as alternate meeting places and a committee was charged with the responsibility of trying to determine a common meeting date with Cedar Rapids service group.

December 16—Mr. Soens reported that contact had been made with the Cedar Rapids group and that they had expressed themselves as in favor of a common meeting date. In the election for a delegate to the national convention, Mr. Tindall was voted delegate and Mr. Brainard, alternate.

MOUNT ROYAL CHAPTER

November 12—Immediately after the meeting had been called to order, President Bob McCullough greeted Lt. Kitchen of the Canadian Navy. Lt. Kitchen was formerly engaged in engineering installation work.

After some discussion it was decided that the chapter should present Mrs. Pigeon with a $10.00 buying certificate for her efforts during the past year. Considerable time was devoted to the discussion of priorities during which Gordon Roe impressed on those present the importance of securing a priority order where possible, pointing out that deliveries could be made much faster where an order is obtained. H. M. Milne made the suggestion that the next meeting be held on a Friday night.

BOSTON CHAPTER

October 14—On the educational program Mr. Nelson Port of the Ansul Chemical Company talked on "Methyl Chloride and Its Properties." In addition, a film entitled "The Story of Thawzone" was shown, following this a film on the sport of fishing, offered a few minutes of entertainment. Refreshments were served after the meeting.

October 28—The meeting was held at Lawrence Hall of the Massachusetts Institute of Technology. Several places for a permanent meeting hall were suggested and each given consideration. It was decided, however, to hold the next meeting at Smith House on Memorial Drive. Refreshments were served following the meeting.

December 8—Reports of the state convention were given by Charles Harris, which showed that the convention was a success in every respect. In the election for delegate to the national convention, Charles Harris was elected delegate and Richard Seddon,

Keep 'em running!

Dog-gone right! We can do it!

★ If the country needs guns and tanks more than refrigerators, it's O.K. by us, we'll just buckle down and keep the ones we've got running. We can do it too! It's the service man's contribution to hitting Hitler and nipping the Nipponese.

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alternate. A nominating committee was appointed to make selections for next year's officers who will be elected at the next meeting. On the educational program, Mr. Binns introduced F. B. Mehaffey of the Air Reduction Sales Company who, in turn, introduced Henry Lucas of the Handy Harmon Company. Mr. Lucas provided a very fine demonstration of low temperature brazing using an oxy-acetylene torch and Sil-fos and Easy-Flo alloys. Refreshments were served following the meeting.

TWIN CITIES CHAPTER

November 18—All business of the evening was dispensed with in order to devote as much time as possible to the planned educational program and to a discussion on priorities. During this discussion much useful information was provided by Frank Pond, Hunt Small and Leonard Carlson regarding the problems of the parts jobber and the necessity for full cooperation with each group of the industry. A further discussion took place in connection with securing signatures to the petition regarding an A-3 priority rating. The matter was then turned over to the Minneapolis Honeywell Company who were sponsors for the educational program for the evening. Messrs. Jenkins, Gross, Newton and Hanson, all of Minneapolis Honeywell Company were present and participated in the program. Mr. Newton went over a number of charts and gave an interesting talk on various controls and their features. At the conclusion of the program a very enjoyable buffet lunch was served by the Minneapolis Honeywell Company.

December 2—During the business session of the evening one new member was admitted to membership, a report was received from Norman Sulenes on the Stag Committee and a report from Les Ost on the Dance Committee. Bill Hauber and Norman Sulenes outlined the proper procedure for handling F-12 during the coming year. Next on the program was the annual election of officers and after following the usual procedure in which several members were nominated for each office, the final results were as follows: *President,* A. M. Palen; *1st Vice President,* Lester A. Ost; *2nd Vice President,* Gaylord V. Randall; *Secretary,* J. C. Ehlers; *Treasurer,* Dean Holmes; *Sergeant-at-Arms,* Harry E. Schaeffer; *Board of Directors,* Wm. Warner, Arthur Larson and Walter Glebb; *Delegates to National Convention,* G. V. Randall and Lester A. Ost.

TOLEDO CHAPTER

December 10—The meeting was devoted to the annual election of officers which resulted in Dale Moog being elected president and A. M. Payment being elected secretary and treasurer.

ONTARIO MAPLE LEAF CHAPTER

December 12—The meeting was called to order by President Ken Wood who, during the course of the business session, asked Bert Nye to secure as much information as possible on the P-22 order and then to arrange a meeting for the purpose of discussing its contents. On the motion of Bill Marshall, seconded by Bob O'Connell, the former assistant secretary was moved up to fill the vacancy occurring through the resignation of A. Smith, secretary. The election of a new assistant secretary was deferred until the next meeting. Nominations were received for a delegate to the national convention, the final outcome of which was the election of Ken Wood. The secretary was instructed to express appreciation of the chapter to Lt. Marion Ross, of the Canadian Red Cross, and to include a check for $10.00 as a contribution from the chapter. Mr. McCullough, President of Mount Royal Chapter, was introduced by Ken Wood and extended greetings from the Mount Royal Chapter.

ST. LOUIS CHAPTER

October 23—The educational program of the evening was provided by educational chairman, E. Gygax. His talk was entitled "Multiplexing of Refrigeration Units." Following this, he gave a brief discussion on methods of securing extreme low temperatures with Freon.

November 13—Mr. Gygax, chairman of the educational committee introduced the speaker of the evening, T. A. Standish of the Armstrong Cork Co. Mr. Standish showed movies of various locker storage plants and the method used in processing meats, fruits and other food products. He then discussed at quite some length the different types of locker plants that had been erected throughout the country.

November 27—Mr. Gygax gave a brief talk about the forthcoming ASRE convention. He then introduced the speaker of the evening, O. G. Tinkey, whose subject was

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This feature of Gilmer V-Belts appeals strongly to refrigeration service men. It frees you from those calls to "come back and fix that belt you put on week before last, it's slipping badly." Gilmer Belts please users of refrigerators, and they'll please you too.

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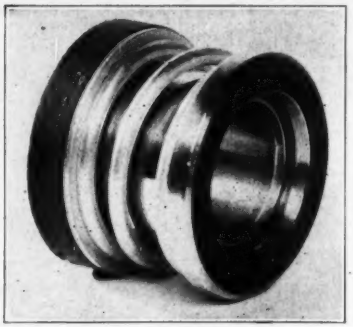

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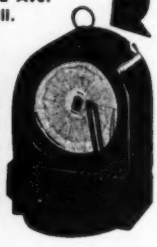

coils. In this talk Mr. Tinkey provided some practical information and stressed the importance of the proper coil for the job. Questions and discussions from the floor occupied considerable time following the talk and brought forth much additional information.

CLEVELAND CHAPTER

December 11—After some discussion of the present critical situation in our nation, the chapter voted to send a contribution to the Red Cross, the amount to represent 50c per paid up member of the chapter. The chapter voted to offer its services and those of its individual members to the civilian defense committee for any work they think suitable. On the educational program, Al Lennox of the Weatherhead Company provided an interesting talk on the "Manufacture of Refrigeration Parts in the Hydrogen Atmosphere Furnace."

MILE HIGH CHAPTER

December 8—An election of delegates to the national convention resulted in Mr. Berger elected delegate with Mr. Darby, alternate. The chapter then voted to offer its services as a group to the Colorado Council of Defense and it was decided that a resolution be presented to the governor of the state and the mayor of the city informing them of the willingness of the chapter to cooperate and help wherever necessary in case of emergency. Messrs. Berger, Hooke and McCombs were appointed as a committee to prepare this resolution and present it at the earliest possible moment. Refreshments were served following the meeting.

WORCESTER CHAPTER

November 4—The major part of the evening was spent in business discussions and the reading of reports from working committees. The committee charged with cooperating with the defense council was asked to go further into the details, thus determining to what extent the chapter may be of assistance as a group. Robert Sheperdson gave a talk on the priorities situation and endeavored to clarify order P-22, both in its original and amended form. He also discussed the possibility of future orders which may widen the scope of the present interpretation. He pointed out the necessity of adequate records in the service shop so that monthly reports may be submitted to OPM.

November 18—The meeting was called to order by President Goodney. The application of Arthur J. Osper was submitted and approved by the members. The balance of the evening was devoted to the discussion of future programs.

LONE STAR CHAPTER NO. 1

December 1—During the business session of the evening a discussion took place on the progress of the price book. Mr. McBryan discussed the Freon situation and what the possibilities are during the forthcoming year. He read order P-22 and such other information as was obtainable regarding the allocation of Freon. The annual election of officers resulted in the election of the following: *President,* J. M. Bibb; *Vice President,* Roy B. Powell; *Secretary,* Corene Endsley; *Treasurer,* M. D. James.

LOUISIANA CHAPTER

December 2—The meeting was almost entirely taken up with the ceremonies attending the presentation of the charter. A very good attendance was enjoyed and the evening proved quite lively through the many spirited debates on various subjects. The annual election of officers was also held at this time, resulting in the following: *President,* E. A. Summer; *Vice President,* H. R. Styer; *Secretary,* D. H. Swails; *Treasurer,* E. W. McCrary; *Delegates to National Convention,* E. A. Summer and O. J. Goldsmith.

ATLANTA CHAPTER

November 25—The gathering came to order with the serving of a Thanksgiving dinner consisting of turkey and all the trimmings. The business session which followed included a discussion of the National Society's efforts in compiling a price book. Delegates to the national convention were elected with Charles Biggers being elected delegate and Thomas L. Carnell, alternate. The delegate and alternate were then instructed by the chapter in its wishes. The attendance award was presented to George Weldon, who returned the money to the chapter to be used as desired.

WICHITA CHAPTER

December 19—The meeting was called to order in the Lassen Hotel and immediately adjourned to re-convene in the office of S. A. Long Company across the street from the

THE VITAL 10!

1. What well-known material destroys moisture chemically . . . effectively?
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Superior Quick-Couplers

—are exactly what the name implies—handy little swivel couplers for "quick-coupling" charging lines, gauge lines, etc. to flare fittings—without the use of wrenches.

A soft composition gasket in the swivel connection does the trick. Run 'em up "finger-tight," and they're "gas-tight." Gasket easily and inexpensively replaced.

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meeting hall where the film entitled, "The Story of Neoprene" was shown. The members then returned to their meeting room for the annual dinner. After the meeting the annual election of officers took place, the following being elected: *President,* H. B. Till; *Vice President,* C. F. Moore; *Secretary-Treasurer,* F. M. Barrell; *Sergeant-at-Arms,* Wallace Garvey.

TRI STATE CHAPTER

December 14—The chapter held its annual Christmas party on this date at which an enjoyable turkey dinner with all the trimmings was served. After the dinner gifts were exchanged and a general good time was enjoyed by all. Mr. McElhaney presented both Mr. and Mrs. Poole with a gift from the chapter in appreciation of their fine work during the past year. Mrs. McElhaney entertained with two recitations and the balance of the evening was spent playing games. During a short business session Mr. Gruber was elected delegate and Mr. Brunton, alternate, to the national convention.

MOTOR CITY CHAPTER

December 9—Mr. Morgan called for a report from the Advertising Committee. Mr. Lifsey, Chairman of the Publicity Committee displayed a layout of a two column ad which, it was later decided, would be inserted in the next edition of the Flint News Advertiser. The matter of a permanent meeting place came up for discussion but no suitable quarters were found. Delegates for the forthcoming convention were nominated from the floor and winners of the election were Messrs. Clark and Hansen.

December 30—The Housing Committee reported that a permanent meeting place had been located and that if the chapter approved of it the Groves Band Room was available with no rental charge. The only disadvantage about it is that it is quite large and out of proportion with the size of the meetings held. It was decided by the chapter that they would continue to hold their meetings in the shop of Bert Clark. Mr. Lifsey discussed the material situation, stressing the scarcity of copper and advising the members to conserve on this material.

Reco
REFRIGERATOR CIRCULATOR

DRIES WET CEILINGS

Operates on a new principle which is revolutionizing refrigerator maintenance. Eliminates water on walls and ceilings, dissipates odors, prevents food spoilage. Prevents frost and ice on coils. Write for free literature.

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Wholesale Distributors
Refrigeration and Air Conditioning
PARTS • TOOLS • SUPPLIES

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Pressure-actuated, renewable seat, ⅜", ½", ¾" pipe fittings.

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Semi-steel, carbon-steel, double-seated stem, Angle and Globe type.

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Safety ball seats shut off liquid in case of glass breakage.

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Furnished filled with Calcium Chloride, Activated Alumina, or Drierite and Silica Gel.

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Cylinder and Cone types, and liquid line scale trap.

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Compact in design, completely rustproof, Angle, Tee and Globe types.

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Do Your Part— "Keep 'em Running"

MOTOR CITY CHAPTER'S FIRST ANNUAL PARTY

Motor City Chapter, Flint, Michigan, held its first annual get-together November 11. It was held in the Athletic Club in Flint. The attendance as shown by the picture was good. Entertainment and educational features included movies entitled "The Story of Thawzone," "Development and Manufacture of Methyl Chloride and Sulphur Dioxide," "The Army on Wheels" and others relating to defense activities. The party was a complete success.

OUR 1942 CATALOG — NOW READY!

When you can depend on your source of supply, half the battle is won!
You will find listed on the pages of our 1942 catalog the thousands of items vital for the refrigeration, air conditioning and heating industries. What is more significant is the fact that we have a complete stock of this merchandise and are prepared to make IMMEDIATE DELIVERY.

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ROCKFORD AUXILIARY

December 14—The annual children's Christmas party was held at the Nelson Hotel on this date. Mr. and Mrs. Herman Goldberg were guests at the party and Mr. Goldberg presented pictures of the Illinois State Convention for the benefit of the grown-ups and for the pleasure and delight of the children, he showed a moving picture of Santa Claus. Following this presentation, Santa Claus paid a visit to the children and presented gifts and candy to each one. Mr. Goldberg took movies of the children's group around Santa Claus. The balance of the evening was taken up with a general get-together, thoroughly enjoyed by grown-ups and children alike.

J. D. COLYER RESIGNS

CHARLES LIMBOCKER, President of Wolverine Tube Company, Detroit, announces the resignation of J. D. Colyer as Director and Vice President in Charge of Sales.

Supervision of all sales work will continue under the direction of Otto Klopsch, Vice President and General Manager, with Robert Moody as Special Assistant, William Gernhart as Office Sales Manager, and John Marshall heading the Publicity Department and Electrical Sales.

R. C. HOOD ADVERTISING MANAGER OF ANSUL

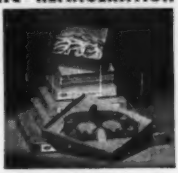
ANSUL CHEMICAL COMPANY announced recently the appointment of Robert C. Hood to advertising manager of the company.

Robert C. Hood known as Bob, is the youngest son of F. G. Hood, founder of the Ansul Chemical Company. He attended the University of Wisconsin and since 1938 has been associated with both accounting and sales departments at the home office in Marinette, Wisconsin.

NEW CATALOGS AND BULLETINS

RANCO, INC., Columbus, Ohio, has just released their new bulletin No. 868 for jobbers. It lists all controls and parts which Ranco will attempt to make available to contracted jobbers. It contains 20 pages and conforms to the suggestions of both the manufacturers and jobbers association as to type, spacing and style.

A COMPLETE ELECTRIC REFRIGERATION GASKET SERVICE



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An unrivaled Gasket Replacement Service. Prompt deliveries insured.

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The exact gaskets you need furnished through your Refrigeration Jobber.

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Your customers will always be satisfied with a JARROW gasket. Odorless and grease resistant.
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Why not send your control jobs to us? We recondition controls equal to new at a small cost. All our work guaranteed for one year. Prices on request.

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repaired or exchanged
at the following prices, F.O.B. Chicago

Automatic Expansion Valves (All Makes)	$1.50
Thermostatic Expansion Valves	3.25
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Domestic Cold Controls (Modern Type)	2.50
Commercial Controls (Temp. or Pressure)	2.75
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DOMESTIC — COMMERCIAL
Cold Controls • Pressure Switches Expansion Valves
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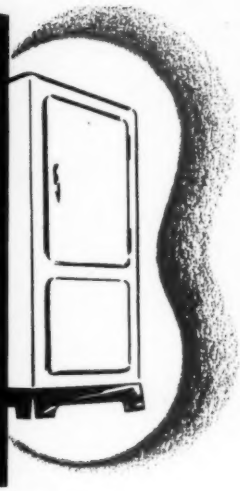

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In 1942, one fact stands out. MAINTENANCE OF EXISTING EQUIPMENT IS VITAL TO THE WELFARE OF 130,000,000 AMERICANS!

Thousands of service engineers and prominent manufacturers of dehydrators face this responsibility with confidence because they have chosen Davison's Silica Gel to overcome refrigeration's worst hazard—moisture. Their experience has proved that Davison's Silica Gel is a major factor in satisfactory performance—its capacity, its speed, its freedom from dusting, its ability to remove acids all add up to *permanent* elimination of breakdowns caused by moisture.

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BONNEY—A Complete Line of Refrigeration Tools

BONNEY Tools for Refrigeration Service are stocked by the leading Refrigeration Supply Jobbers in practically every locality because they know that Bonney Sockets, Wrenches, Screw Drivers, Punches, Chisels, Pliers, etc. meet practically every demand of the Refrigeration Service Engineer.

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